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3M Respirator Selection Guide



For more information

In U.S.

Technical Assistance 1-800-243-4630

Customer Care Center 1-800-328-1667

[3M.com/PPESafety](https://www.3M.com/PPESafety)

In Canada

Technical Assistance 1-800-267-4414

Customer Care 1-800-364-3577

[3M.ca/PPESafety](https://www.3M.ca/PPESafety)

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WARNING

Respirator Capabilities and Limitations

- Selection of appropriate respiratory protective equipment (RPE) will depend on each situation and should be made only by a competent person knowledgeable of the actual working conditions and the limitations of RPE.
- Refer to applicable government regulations regarding respirator selection, which take precedence over a respirator manufacturer's guidance. In the U.S., please see www.osha.gov or <https://multimedia.3m.com/mws/media/2191610/3m-regulations-handbook-respiratory-protection.pdf> for more information.
- Respirators help protect against certain airborne contaminants, but no respirator is capable of preventing all airborne contaminants from entering the wearer's breathing zone.
- Hazardous airborne contaminants in the workplace must be identified and quantified. Many contaminants that can be dangerous to a person's health cannot be seen or smelled at dangerous levels.
- Do not use respirators when airborne contaminant concentrations exceed maximum use concentrations established by regulatory agencies.
- Only use self-contained breathing apparatus (SCBA) or combination supplied air/SCBA when concentrations are unknown, or in atmospheres containing less than 19.5% oxygen. Air purifying respirators do not supply oxygen.
- Before use, the wearer must read and understand the respirator *User Instructions*. **Failure to follow all instructions and limitations on the use of these respirators and/or failure to wear them properly during all times of exposure can reduce respirator effectiveness and may result in sickness or death.**
- Before use of any respirator, the wearer must first be trained by their employer in proper respirator use in accordance with applicable safety and health standards.
- In the U.S., a written respiratory protection program must be implemented meeting all the requirements of OSHA 29 CFR 1910.134 including training, fit testing, and medical evaluation. In Canada, CSA standard Z94.4 requirements must be met and/or requirements of the applicable jurisdiction, as appropriate.

- Leave the contaminated area immediately if dizziness or other distress occurs, if the respirator becomes damaged or breathing becomes difficult, if contaminants can be smelled or tasted, or if irritation occurs.
- Do not use tight-fitting respirators or loose-fitting facepieces with beards or other facial hair or conditions that prevent direct contact between the face and the edge of the respirator.
- Maintenance, cleaning, and storage programs must be established and routinely followed for respirators that are reused.
- For correct use, consult supervisor and *User Instructions*, or call 3M Personal Safety Division (PSD) Technical Service in the U.S.A. at 1-800-243-4630. In Canada, call 1-800-267-4414.

How to Use This Guide

Respirators are normally selected based upon workplace contaminants, concentrations, application specific requirements and human factors.

Contaminants

1. Identify the air contaminants present in the workplace and list them on the form contained in this guide or on your own form. If contaminants are unknown, or in atmospheres containing less than 19.5% oxygen, use only self-contained breathing apparatus (SCBA) or combination supplied air/SCBA for the respirator type.

| Contaminant | Filter, Cartridge or Supplied Air | IDLH | OEL | Air Concentration | Hazard Ratio | Respirator Type |
|-------------|-----------------------------------|------|-----|-------------------|--------------|-----------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Summary | | | | | | |

2. Look up each of your contaminants in this guide. Enter the suggested type of filters and/or cartridges or supplied air (SA) in the form. An explanation of the abbreviations is given at the end of the guide.

Note:

- If airborne oil mist is present in addition to your listed contaminants, then a R- or P-series or HEPA filter must be selected instead of a N-series filter.
- If any of the contaminants are being aerosolized (e.g. sprayed), then a particle filter must be added if not already included.
- For powered air purifying respirators (PAPRs), use a HEPA filter instead of the N, R or P type particle filters listed in the guide.

On the bottom row, list the type of filter and/or cartridge that is applicable for ALL of the contaminants together on your form. If SA is suggested for any of the contaminants, or if there is no sufficient cartridge/filter for all of the contaminants together, then SA must be used.

3. Where applicable, list contaminant air concentrations considered immediately dangerous to life or health (IDLH) on the form. IDLH values are published by the National Institute for Occupational Safety and Health (NIOSH) <https://www.cdc.gov/niosh/idlh/default.html>, but OSHA allows employers to use other IDLH values. The lower explosive level (LEL) or the concentration that would result in an oxygen deficient atmosphere should also be considered IDLH. If contaminant exposure levels are potentially at or above IDLH, use only self-contained breathing apparatus (SCBA) or combination supplied air/SCBA for the respirator type.

4. Enter the occupational exposure limits (OELs) on the form. References for OELs include www.OSHA.gov for permissible exposure limits (PELs) or www.acgih.org for threshold limit values (TLV@s). Depending on the contaminant you may need to enter more than one type of OEL based on the duration and variability of exposure levels:

- Time Weighted Average (TWA) exposure limits are for an eight (8) hour workday and a forty (40) hour workweek.
- Short-Term Exposure Limits (STEL) are a 15-minute time weighted average exposure.
- Ceiling (C) exposure limits refer to concentrations that should not be exceeded during any part of the workday.

If you have extended work shifts, or multiple contaminants with similar health effects you may wish to adjust the OELs—see an industrial hygienist for assistance.

5. Determine contaminant air concentrations and list them on the form. Air sampling in the worker's breathing zone is highly recommended. Consideration should be given to the 8 hour time weighted average (TWA), 15 minute short term and peak (ceiling) exposures, while keeping in mind seasonal and worker variability and the specific process being used.

6. Calculate the hazard ratio (HR) as the airborne contaminant concentration / OEL. Enter the hazard ratio on the form.
7. Choose a respirator type with an assigned protection factor (APF) that is higher than the hazard ratio. Assigned protection factors* per OSHA 29 CFR 1910.134 are as follows:

Air Purifying Respirators

- Half facepiece (filtering facepiece-disposable and reusable): 10
- Full facepiece (with quantitative fit testing): 50

Powered Air Purifying Respirators

- Loose-fitting facepiece: 25
- Half facepiece: 50
- Full facepiece, helmet, or hood: 1000**

Supplied Air Respirators (airline)

- Continuous Flow
 - Loose-fitting facepiece: 25

- Half facepiece: 50
- Full facepiece, helmet, or hood: 1000**

- Pressure demand with full facepiece: 1000

Self-Contained Breathing Apparatus (SCBA)

- Pressure demand airline with escape SCBA: 10,000 unknown and IDLH atmospheres
- Pressure demand SCBA: 10,000 unknown and IDLH atmospheres

*Assigned protection factors may vary based on specific standards such as those promulgated by U.S. OSHA. Where assigned protection factors in local, state, or federal standards are lower than those listed here, they should be used instead. For additional limitations of 3M respiratory protection products, refer to 3M respirator packaging and *User Instructions*.

** Respirator manufacturer must provide

data demonstrating performance of 1000 or greater, otherwise APF of 25.

Other Considerations

- If a gas/vapor cartridge is selected, a change schedule must be implemented, otherwise supplied air respirators must be used instead.
- If any of the respirator codes contain the (F) designation, respirators with half facepieces cannot be used unless appropriate eye protection is also worn.
- If a chemical can be absorbed through the skin, skin protection may be required in addition to respiratory protection. Eye protection may also be necessary if not provided by the respirator. Failure to provide adequate skin or eye protection can invalidate established exposure limits and make respirator use ineffective for

protection against certain workplace contaminants.

Application Specific Requirements and Human Factors

Consider the entire package of safety equipment required for the job. The respirator selected must be compatible with hard hats, goggles, glasses, welding hoods, face shields, etc. In addition, the worker must be able to communicate and perform required job duties without removing the respirator. If strenuous work is to be performed, or if the respirator is to be worn for an extended period of time, it may be desirable to select a lightweight respirator with low breathing resistance. If a respirator does not have good worker acceptance or is not worn consistently, it will not provide the expected protection.

When specifying supplied air respirators, consider the distance the worker must travel to get to an uncontaminated work area,

as well as obstacles or equipment present in the area. If ladders or scaffolds must be climbed, a supplied air respirator with air line may not be appropriate.

Questions?

For assistance, call 3M Personal Safety Division (PSD) Technical Service in the U.S.A. at 1-800-243-4630. In Canada, call 1-800-267-4414.

Selection Guide Format Explanation Contaminant

Contaminant names listed in this guide are generally those used in the Threshold Limit Values and Biological Exposure Indices published by the American Conference of Governmental Industrial Hygienists (ACGIH). Pesticides and chemicals without established occupational exposure limits are not included. Call 3M Technical Service for assistance in selecting respirators for

these chemicals.

CAS#

Chemical abstract service registry numbers were established by the American Chemical Society to harmonize chemical identification regardless of the synonym used or differences in spelling.

Synonyms

Several common synonyms are listed in this column.

Respirator Type

This column lists the suggested type of particulate, gas/vapor, or supplied air respirator. The abbreviations used are explained at the end of this document.

Not all of these respirators have been specifically tested against each compound listed. Either specific testing or a review of chemical and physical properties of the materials, as well as adsorption or filtration

characteristics of the respirators, forms the basis for the recommendations.

The recommendations are for single substances. When two or more substances are present, a combination respirator may be appropriate. For example, with a spray paint that contains organic solvents and titanium dioxide, a respirator consisting of an organic vapor cartridge and a particle filter may be appropriate. In cases where an air purifying respirator is not available for all of the substances of concern in a mixture, a supplied air respirator may be required.

In some cases, the respirator is preceded by an “(F)” designation. These contaminants have been identified as potential eye irritants. Full facepieces, hoods, helmets or loose fitting facepieces, or half facepieces with

appropriate eye protection should be considered.

Particulate Filter Definitions

N-Series filters may be used for solid or liquid airborne particulates that do not contain oil.

R-Series filters may be used for solid or liquid airborne particulates including oil-based aerosols. If the atmosphere contains oil, R-series filters are limited to 8 hours of continuous or intermittent use.

P-Series filters may be used for solid or liquid airborne particulates including oil-based aerosols. NIOSH requires that respirator manufacturers establish time-use limitations for all P-series filters. 3M recommends that in atmospheres containing oil aerosols, P-series filters are limited to 40 hours of use or 30 days, whichever occurs first.

Note: All particle filters must also be replaced subject to conditions of hygiene, damage or

increased breathing resistance/reduced air flow.

Oils are mineral, vegetable and synthetic substances and animal and vegetable fats that are generally slippery, combustible, viscous, liquid or liquefiable at room temperatures soluble in various organic solvents such as ether but not in water.

95 level filter is > 95% filtration efficiency per the NIOSH 42 CFR 84 test method.

100 level filter is > 99.97% filtration efficiency per the NIOSH 42 CFR 84 test method.

HEPA Filter is > 99.97% filtration efficiency per the NIOSH 42 CFR 84 test method for powered air purifying respirators (PAPRs) only. Use instead of N, R, P type filters.

Comments

Other information may be listed in this column:

- A. Short service life means predicted cartridge life of less than 30 minutes at concentrations such as 10 times the OEL, or the contaminant's boiling point is less than 65C. Actual service life will vary considerably depending on concentration levels, temperature, humidity, work rate, etc. See 3M Service Life Software www.3M.com/sls to estimate cartridge service life. Sometimes a supplied air respirator is recommended because the service life may be so short that the frequency required for changing the cartridges is not practical.
- B. References to a respirator not being specifically approved refer to a lack of approval for a particular substance. All respirators listed in this guide are NIOSH approved for certain substances and/or conditions.
- C. References to Ineffective sorbents or Unknown sorbent effectiveness indicate 3M does not make chemical cartridge respirators appropriate for these substances at this time or it is not known how effective the sorbents would be for these materials.
- D. These compounds have been identified as possibly existing in both particulate and vapor phase in the workplace. For these compounds, 3M recommends that a gas/vapor cartridge be used in addition to the traditionally accepted particulate filter. It is the user's responsibility to determine whether both forms coexist. Both chemical properties and use conditions/processes can affect the physical form in the workplace. Users should consider specific exposure data and workplace conditions before making their final selection.* If a chemical cartridge is used, a change schedule must be established to replace the cartridges before the end of their service life.
- E. These compounds have been identified as possibly existing in both vapor and particulate phase in the workplace. Even though these chemicals would be expected to be in the vapor phase, when other aerosols are present or there is high humidity, it is possible that the vapor may be adsorbed onto these coexisting particles or dissolved in available water droplets; therefore, 3M recommends a filter for the particulate phase be used in addition to the traditionally accepted chemical cartridge. It is the user's responsibility to determine whether both forms coexist. Both chemical properties and use conditions/processes can affect the physical form in the workplace. Users should consider specific exposure data and workplace conditions before making their final selection.*

- F. It is believed that an N-series filter is sufficient since these materials will not coat the filter fibers, but since this material may contain oil aerosols, an R- or P-series filter is recommended until further research or a regulatory agency takes a specific position.
- G. R- or P-series filters have been recommended pending more research as to how these materials affect the filter fibers.
- H. 3M™ Personal Air Monitors may be used to measure the amount of specific organic vapors, aldehydes or ethylene oxide in the air. 3M Monitors may be purchased with or without pre-paid analysis. Please see www.3M.com/badgemonitors for more information.
- I. Skin notations indicate the substance can be absorbed through the skin. In these cases, appropriate measures must be taken to prevent skin and eye contact to avoid invalidating the OEL.

* See Perez, C. and S. C. Soderholm: Some Chemicals Requiring Special Consideration When Deciding Whether to Sample the Particle, Vapor, or Both Phases of an Atmosphere. *Appl. Occup. Hyg.* 6(10): 859-864 (1991).

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---------------------|----------|--|-------|----------------|--|
| Acetaldehyde | 75-07-0 | Acetic aldehyde, Ethanal | | (F)OV (F)MG | Short OV service life. Multigas cartridge recommended for longer service life. 3M Formaldehyde Monitors. |
| Acetamide | 60-35-5 | Ethanamide | | OV/N95 | See comment D in Introduction |
| Acetic acid | 64-19-7 | Ethanoic acid, Glacial acetic acid, Methane carboxylic acid, Vinegar acid | | (F)OV/AG | |
| Acetic anhydride | 108-24-7 | Acetic acid anhydride, Acetyl oxide, Ethanoic anhydride | | (F)OV | |
| Acetone | 67-64-1 | 2-Propanone, Dimethyl ketone, Ketone propane | | OV | Short service life. 3M Organic Vapor Monitors. |
| Acetone cyanohydrin | 75-86-5 | 2-Cyano-2-propanol, 2-Hydroxy-2-methyl propanenitrile, 2-Methylactonile, 2-Propane cyanohydrin, a-Hydroxy isobutyronitrile | Y | OV | |
| Acetonitrile | 75-05-8 | Cyanomethane, Ethane nitrile, Ethyl nitrile, Methanecarbonitrile, Methyl cyanide | Y | OV | 3M Organic Vapor Monitors |

NOTE: See important warnings, definitions, and explanation of column headings and abbreviations starting on page 1. For occupational exposure limits, please see your local regulatory authority. In the US, please see <https://www.osha.gov/annotated-pels>.

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|----------------------|----------|--|-------|------------|---|
| Acetophenone | 98-86-2 | 1-Phenylethanone, Acetyl benzene, Benzoyl methide, Methyl phenyl ketone | | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Acetylsalicylic acid | 50-78-2 | Aspirin | | N95 | |
| Acrolein | 107-02-8 | Acrylaldehyde, Acrylic aldehyde, Allylaldehyde, Propenal | Y | (F)OV | Short service life |
| Acrylamide | 79-06-1 | Acrylamide monomer, Acrylic amide, Propenamide | Y | OV/N95 | See comment D in Introduction |
| Acrylic acid | 79-10-7 | Acroleic acid, Propenoic acid | Y | (F)OV | |
| Acrylonitrile | 107-13-1 | AN, Propenenitrile, Vinyl cyanide | Y | OV | SA if cartridge not disposed of after shift, per 29 CFR 1910.1045. 3M Organic Vapor Monitors. |
| Adipic acid | 124-04-9 | 1,4-Butanedicarboxylic acid, 1,6-Hexanedioic acid, Adipinic acid, Hexanedioic acid | | (F)N95 | |
| Adiponitrile | 111-69-3 | 1,4-Dicyanobutane, Addipic acid dinitrile, Hexanedinitrile, Tetramethylene cyanide | Y | OV | |
| Allyl alcohol | 107-18-6 | 2-Propen-1-ol, 2-Propenol, Vinyl carbinol | Y | (F)OV | 3M Organic Vapor Monitors |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|-----------|--|-------|------------|--|
| Allyl bromide | 106-95-6 | 1-Bromo-2-propene; 1-Propene, 3-bromo-; 2-Propenyl bromide; 3-Bromo-1-propene; 3-Bromopropene; 3-Bromoproylene | Y | (F)OV | |
| Allyl chloride | 107-05-1 | 1-Chloro-2-propene, 3-Chloropropene | Y | OV | Short service life. 3M Organic Vapor Monitors. |
| Allyl glycidyl ether | 106-92-3 | 1-Allyloxy-2,3-epoxy-propane, AGE | | (F)OV | |
| Allyl isothiocyanate | 57-06-7 | AITC, Allyl isosulfocyanate, Allyl thiocarbamide, 3-Isothiocyanate-1-propene, Oil of mustard | Y | OV | SA if used with acids |
| Allyl methacrylate | 96-05-9 | AMA | Y | OV | |
| Allyl propyl disulfide | 2179-59-1 | 2-Propenyl propyl disulfide, Onion oil, Propyl allyl disulfide | | (F)OV | |
| alpha-Alumina | 1344-28-1 | | | N95 | |
| Aluminum metal and insoluble compounds | 7429-90-5 | | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------------|------------|---|-------|------------|---------------------------------------|
| p-Aminobenzoic acid | 150-13-0 | 4-Aminobenzoic acid, Aminobenzoic acid, PABA | | (F)N95 | |
| 2-Aminopyridine | 504-29-0 | a-Aminopyridine | | OV | |
| Aminotri (methylenephosphonic acid) | 6419-19-8 | ATMP, Briquest 301-32S, Briquest 302-500, Dequest 2000, Dequest 2001, Nitriлотrimethanephosphonic acid, NTF, NTMP, NTPA | | AG/N95 | If heated, AG cartridge may be needed |
| Ammonia | 7664-41-7 | Anhydrous ammonia | | (F)AM | Irritation also provides warning |
| Ammonium chloride (liquids) | 12125-02-9 | | | AM/N95 | |
| Ammonium chloride (solids) | 12125-02-9 | | | N95 | |
| Ammonium perfluorooctanoate | 3825-26-1 | | Y | OV/N95 | See comment D in Introduction |
| n-Amyl alcohol | 71-41-0 | 1-Pentanol, Amyl alcohol, n-Butyl carbinol, n-Pentanol, Pentanol, Pentyl alcohol | | (F)OV | |
| tert-Amyl methyl ether | 994-05-8 | TAME | | OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------------------|---|-------|------------|--|
| Aniline | 62-53-3 | Aminobenzene, Aniline oil, Phenylamine | Y | OV | |
| o-Anisidine | 90-04-0 29191-52-4 | 2-Methoxyaniline, o-Aminoanisole, o-Methoxyaniline (oil) | Y | OV/P95 | |
| p-Anisidine | 104-94-9 29191-52-4 | 4-Methoxyaniline, p-Aminoanisole, p-Methoxyaniline (solid) | Y | OV/N95 | |
| Antimony and compounds (as Sb) | 7440-36-0 | | | N95 | |
| Arsenic, elemental | 7440-38-2 | | | N100 | |
| Arsenic, inorganic compounds (except arsine) (as As) | | | | MG/N100 | No half mask respirators for arsenic trichloride because of skin adsorption. N100 may be appropriate if vapor concentrations are below exposure limits |
| Arsenic, organic compounds (as As) | | Arsenic, organic compounds (as As) | | OV/N100 | MG/N100 may be required for certain organic arsenic compounds |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------------------------|-----------|--|-------|------------|--|
| Arsine | 7784-42-1 | Arsenic hydride, Arsenic trihydride, Arseniuretted hydrogen, Arsenous hydride, Hydrogen arsenide | | (F)SA | Unknown sorbent effectiveness |
| Asbestos | 1332-21-4 | Actinolite, Amosite, Anthophyllite, Chrysotile, Crocidolite, Tremolite | | N100 | Dual cartridge as per 29 CFR 1910.1001, 1915.1001 and 1926.1101 |
| Asphalt (petroleum; bitumen) fumes | 8052-42-4 | Asphaltic bitumen, Asphaltum, Bitumen, Hot mix asphalt, Mineral pitch, Petroleum asphalt, Road asphalt, Road tar | | OV/P95 | R or P95 alone may be suitable for some applications. See comment F in Introduction |
| Barium and soluble compounds (as Ba) | 7440-39-3 | | | N95 | |
| Barium sulfate | 7727-43-7 | | | N95 | |
| Benzaldehyde | 100-52-7 | Benzenecarbonal, Benzoic aldehyde, Oil of bitter almond | | (F)OV | 3M Formaldehyde Monitors |
| Benzene | 71-43-2 | Benzol, Coal tar naptha | Y | OV | SA if cartridges are not replaced at the start of each shift, per 20 CFR 1910.1028. 3M Organic Vapor Monitors. |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------|----------|---|-------|---------------------|--|
| Benzophenone | 119-61-9 | Benzoyl benzene, Diphenyl ketone, Diphenyl methanone, Phenyl ketone | | OV/N95 | See comment D in Introduction |
| Benzotrichloride | 98-07-7 | Benzenyl trichloride, Benzenylchloride, Benzoic trichloride, Benzyl trichloride, Phenyl chloroform, Toluene trichloride, Trichloromethylbenzene | Y | (F)OV | |
| Benzoyl chloride | 98-88-4 | a-Chlorobenzaldehyde, Benzene carbonyl chloride, Benzoic acid chloride | | "(F)OV/AG (F)MG" | |
| Benzoyl peroxide | 94-36-0 | Dibenzoyl peroxide | | OV/N95 | See comment D in Introduction |
| Benzyl acetate | 140-11-4 | Acetic acid benzyl ester, Acetic acid phenylmethyl ester, Phenylmethyl acetate | | OV/N95 | |
| Benzyl alcohol | 100-51-6 | a-Hydroxytoluene, Phenylcarbinol, Phenylmethanol | | (F)OV | 3M Organic Vapor Monitors |
| Benzyl chloride | 100-44-7 | a-Chlorotoluene | | (F)OV/AG | See comment E in Introduction. 3M Organic Vapor Monitors. |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|---|-------|------------|---|
| Beryllium and compounds (as Be) | 7440-41-7 | | Y | N95 | See OSHA standard 1910.1024 regarding PAPRs requested by employee |
| Biphenyl | 92-52-4 | Diphenyl, Phenylbenzene | | OV/N95 | |
| Bismuth telluride (undoped) | 1304-82-1 | Bismuth sesquitelluride | | N95 | |
| Bismuth telluride (Se-doped) (as Bi ₂ Te ₃) | | | | N95 | |
| Boric acid | 10043-35-3 | Borofax, Boron trihydroxide, Hydrogen orthoborate, Kill-off, Kjel-sorb, Orthoboric acid, Three elephant, Trihydroxyborane | | N95 | |
| Boron oxide | 1303-86-2 | Anhydrous boric acid, Boric anhydride, Boric oxide | | N95 | |
| Boron tribromide | 10294-33-4 | Boron bromide | | (F)AG | |
| Boron trichloride | 10294-34-5 | Trichloroboron | | (F)AG | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|----------------------------------|-----------|---------------------------------|-------|------------|--|
| Boron trifluoride | 7637-07-2 | | | (F)AG | |
| Boron trifluoride diethyl ether | 109-63-7 | | | (F)OV/AG | |
| Boron trifluoride dimethyl ether | 353-42-4 | | | (F)OV/AG | |
| Bromine | 7726-95-6 | | | (F)AG | Irritation also provides warning |
| Bromine pentafluoride | 7789-30-2 | | | AG | |
| Bromoform | 75-25-2 | Tribromomethane | | (F)OV | |
| 1-Bromopropane | 106-94-5 | n-Propylbromide, Propylbromide, | | OV | 3M Organic Vapor Monitors |
| 1,3-Butadiene | 106-99-0 | Biethylene, Divinyl, Erythrene | | OV | Cartridges must be replaced per 29 CFR 1910.1051. 3M Organic Vapor Monitors. |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---------------------------------------|----------|--|-------|------------|---|
| Butane | 106-97-8 | n-Butane, Methyl ethyl methane | | SA | Short OV service life |
| 1-Butene | 106-98-9 | 1-Butylene, a-Butene, a-Butylene, But-1-ene, Ethylethylene | | OV | Short service life |
| 2-Butene (mixture of trans- and cis-) | 107-01-7 | b-Butene, b-Butylene, Dimethylethylene, Pseudobutylene | | OV | Short service life |
| cis-2-Butene | 590-18-1 | b-cis-Butylene, cis-1,2-Dimethylethylene, cis-Butene, cis-Butene-2 | | OV | Short service life |
| trans-2-Butene | 624-64-6 | 2-Butene, (E)-, 2-trans-Butene, b-trans-Butylene, trans-1,2-Dimethylethylene, trans-Butene | | OV | Short service life |
| 2-Butoxyethanol | 111-76-2 | Butyl Cellosolve®, Ethylene glycol monobutylether | | (F)OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| 2-Butoxyethyl acetate | 112-07-2 | Acetic acid, 2-butoxyethyl ester; 2-Butoxyethanol acetate; Butyl Cellosolve™ acetate; Butylglycol acetate; EGBA; Ektasolve EB acetate; Ethylene glycol monobutyl ether acetate; Glycol monobutyl ether acetate | | OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------|----------|---|-------|------------|--|
| n-Butyl acetate | 123-86-4 | Acetic acid butyl ester, Butyl acetate, Butyl ethanoate | | (F)OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| sec-Butyl acetate | 105-46-4 | 1-Methylpropylacetate | | (F)OV | See comment E in Introduction |
| tert-Butyl acetate | 540-88-5 | Acetic acid tert-butyl ester | | (F)OV | 3M Organic Vapor Monitors |
| Butyl acrylate | 141-32-2 | 2-Propenoic acid butyl ester, Butyl 2-propenoate | | OV | 3M Organic Vapor Monitors |
| n-Butyl alcohol | 71-36-3 | 1-Butanol, n-Butanol, Butyl alcohol, Butyl hydroxide, Butyric alcohol, 1-Hydroxybutane, Methylolpropane, n-Propyl carbinol, Propyl methanol | | (F)OV | 3M Organic Vapor Monitors |
| sec-Butyl alcohol | 78-92-2 | 2-Butanol, Methyl ethyl carbinol | | (F)OV | 3M Organic Vapor Monitors |
| tert-Butyl alcohol | 75-65-0 | 2-Methyl-2-propanol, TBA, Trimethyl carbinol | | (F)OV | 3M Organic Vapor Monitors |
| Butylamine | 109-73-9 | 1-Aminobutane, n-Butylamine | Y | AM | AM not specifically approved, but 3M recommended for longer service life |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------|-----------|--|-------|------------|----------------------------------|
| Butylated hydroxytoluene | 128-37-0 | 2,6-bis(1,1-Dimethylethyl)-4-methylphenol; 2,6-Di-tert-butyl-p-cresol; BHT; DBPD | | (F)OV/N95 | See comment D in Introduction |
| 4-tert-Butylcatechol | 98-29-3 | 4-(1,1-Dimethylethyl)-1,2-benzenediol; 4-tert-Butyl pyrocatechol; 4-tert-Butyl-1,1,2-dihydroxy benzene; p-tert-Butylcatechol | Y | (F)N95 | |
| tert-Butyl chromate (as CrO3) | 1189-85-1 | Chromic acid di-tert-butyl ester | Y | N95 | |
| Butylene oxide | 106-88-7 | BO; 1-Butene oxide; 1,2-Butene oxide; 1,2-Butylene oxide; Epoxy-butane; 1,2-Epoxybutane | | OV | Short service life |
| n-Butyl glycidyl ether | 2426-08-6 | 1,2-Epoxy-3-butoxypropane, BGE | Y | OV | 3M Organic Vapor Monitors |
| tert-Butyl Hydroperoxide | 75-91-2 | 1,1-Dimethylethyl hydroperoxide | Y | (F)OV | Irritation also provides warning |
| n-Butyl lactate | 138-22-7 | Lactic acid butylester | | OV | Irritation also provides warning |
| Butyl mercaptan | 109-79-5 | 1-Mercaptobutane, n-Butanethiol | | OV | |
| o-sec-Butylphenol | 89-72-5 | 2-sec-Butylphenol | Y | OV/P95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------|------------|---|-------|------------|---|
| p-tert-Butyltoluene | 98-51-1 | 1-Methyl-4-tert-butylbenzene | | OV | |
| Butyraldehyde | 123-72-8 | Butal, Butaldehyde, Butalyde, Butanal, Butanaldehyde, Butylaldehyde, Butyral butyric aldehyde | | (F)Form | Formaldehyde cartridge not specifically approved, but 3M recommended for longer service life. 3M Formaldehyde Monitors. |
| Cadmium and compounds (as Cd) | 7440-43-9 | Cadmium oxide fume | | N100 | |
| Calcium arsenate (as As) | 7778-44-1 | Cucumber dust, Tricalcium arsenate, Tricalcium o-arsenate | | N100 | |
| Calcium carbonate | 1317-65-3 | Limestone, Marble | | N95 | |
| Calcium chromate | 13765-19-0 | Calcium chrome yellow | Y | N95 | |
| Calcium cyanamide | 156-62-7 | Calcium carbimide, Lime nitrogen | | N95 | |
| Calcium fluoride (as F) | 7789-75-5 | Fluorite, Fluorospar | | N95 | |
| Calcium hydroxide | 1305-62-0 | Calcium hydrate, Caustic lime, Hydrated lime | | N95 | |
| Calcium oxide | 1305-78-8 | Pebble lime, Quicklime | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|-----------|---|-------|------------|-------------------------------|
| Calcium silicate (containing no asbestos and <1% crystalline silica) | 1344-95-2 | Calcium hydrosilicate, Wollastonite | | N95 | |
| Calcium sulfate | 7778-18-9 | Gypsum, Plaster of Paris, | | N95 | |
| Camphor | 76-22-2 | 2-Camphonone, Gum camphor, Laurel camphor, Synthetic camphor | | (F)OV/N95 | 3M Organic Vapor Monitors |
| Caprolactam | 105-60-2 | 2-Oxohexamethylenimine, Aminocaproic lactam | | OV/N95 | See comment D in Introduction |
| Captan | 133-06-2 | N-(Trichloromethylthio)-4-cyclohexene- 1,2-dicarboximide | | N95 | |
| Carbon black | 1333-86-4 | Acetylene black, Channel black, Furnace black, Lamp black, Thermal black | | N95 | |
| Carbon dioxide | 124-38-9 | Carbonic acid gas, Dry ice | | SA | Ineffective sorbents |
| Carbon disulfide | 75-15-0 | Carbon bisulfide, Carbon bisulfur, Carbon bisulphide, Carbon disulphide, Carbon sulfide, Dithiocarbonic anhydride, Sulphocarbonic anhydride, Weevitox | Y | OV | Short service life |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------------|------------|---|-------|------------|---------------------------|
| Carbon monoxide | 630-08-0 | Monoxide | | SA | Ineffective sorbents |
| Carbon tetrabromide | 558-13-4 | Tetrabromomethane | | (F)OV | |
| Carbon tetrachloride | 56-23-5 | Tetrachloromethane | Y | (F)OV | 3M Organic Vapor Monitors |
| Carbonyl fluoride | 353-50-4 | Carbon oxyfluoride, Fluoroformyl fluoride | | (F)MG | |
| Carbonyl sulfide | 463-58-1 | Carbon monoxide monosulfide, Carbon oxide sulfide, Carbon oxysulfide, Oxycarbon sulfide | | SA | |
| Catechol | 120-80-9 | Pyrocatechol | Y | OV/N95 | |
| Cellulose | 9004-34-6 | Paper fiber | | N95 | |
| Cesium fluoride (as F) | 13400-13-0 | | | N95 | |
| Cesium hydroxide | 21351-79-1 | Cesuim hydrate | | N95 | |
| Chloramphenicol | 56-75-7 | [R-(R*,R*)]-2,2-dichloro-N-[2,hydroxy-1-(hydroxy methyl)-2-(4-nitrophenyl) ethyl] acetamide; Chloromycetin; Levomycetin | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------------|------------|---|-------|------------|----------------------------------|
| Chlorinated diphenyl oxide | 31242-93-0 | Hexachlorodiphenyl oxide | | OV/P95 | |
| Chlorine | 7782-50-5 | | | (F)AG | Irritation also provides warning |
| Chlorine dioxide | 10049-04-4 | Chlorine oxide, Chlorine peroxide | | AG | |
| Chlorine trifluoride | 7790-91-2 | Chlorine fluoride | | MG | |
| Chloroacetaldehyde | 107-20-0 | 2-Chloroethanal, Chloroacetaldehyde (40% aqueous) | | (F)OV | |
| Chloroacetone | 78-95-5 | Chloracetone, 1-Chloro-2-propanone, Monochloroacetone | Y | (F)OV | |
| Chloroacetyl chloride | 79-04-9 | Chloracetyl chloride | Y | (F)OV/AG | |
| Chlorobenzene | 108-90-7 | Chlorobenzol, MCB, Monochlorobenzene, Phenyl chloride | | OV | 3M Organic Vapor Monitors |
| Chlorobromo-methane | 74-97-5 | Bromochloromethane, CBM, Halon™ 1011, Methylene chlorobromide | | OV | |
| 1-Chloro-1,1-difluoroethane | 75-68-3 | a-Chloroethylidene fluoride, Chlorodifluoroethane, Dymel® 142b, Genetron™ 142b, HCFC-142b | | SA | Short OV service life |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|----------------------------------|------------|--|-------|------------|---|
| Chlorodifluoro -methane | 75-45-6 | Freon® 22 | | SA | Ineffective sorbents |
| Chlorodiphenyl (42% chlorine) | 53469-21-9 | PCB, Polychlorinated biphenyl | Y | (F)OV/P95 | See comment D in Introduction |
| Chlorodiphenyl (54% chlorine) | 11097-69-1 | PCB, Polychlorinated biphenyl | Y | (F)OV/P95 | See comment D in Introduction |
| Chloroform | 67-66-3 | Trichloromethane | | OV | 3M Organic Vapor Monitors |
| bis-(2-Chloroisopropyl) ether | 39628-32-9 | BCIPE; bis-(1-methyl-2-chloroethyl) ether; bis-2-chloro-1-methylethyl ether; Dichloroisopropyl ether | | (F)OV | |
| bis-Chloromethyl ether | 542-88-1 | BCME, Chloro (chloromethoxy) methane, Chloromethyl ether, Dichloromethylether | | (F)OV | OSHA requires SA with hood for certain applications; see 29 CFR 1910.1003 |
| Chloropentafluoro -ethane | 76-15-3 | FC-115, Monochloropentafluoroethane | | SA | Short OV service life |
| Chloropicrin | 76-06-2 | Nitrochloroform, Nitrotrichloromethane, Trichloronitromethane | | (F)SA | Irritation also provides warning |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------------------------|-----------|---|-------|------------|--|
| b-Chloroprene | 126-99-8 | 2-Chloro-1,3-butadiene; beta-Chloroprene; Chlorobutadiene | Y | (F)OV | Short service life |
| 2-Chloropropane | 75-29-6 | 2-CP, 2-Propyl chloride, Isoprid, Isopropyl chloride | | OV | Short service life |
| 1-Chloro-2-propanol | 127-00-4 | 1-Chloro-2-hydroxypropane, 1-Chloroisopropyl alcohol, sec-Propylene chlorohydrin | Y | OV | |
| 2-Chloro-1-propanol | 78-89-7 | 1-Hydroxy-2-chloropropane, 2-Chloropropanol, 2-Chloropropyl alcohol, Propylene chlorohydrin | Y | OV | |
| 2-Chloropropionic acid | 598-78-7 | a-Chloropropionic acid | Y | OV/AG | |
| o-Chlorostyrene | 2039-87-4 | 1-Chloro-2-ethenylbenzene, 2-Chlorostyrene | | OV | |
| Chlorosulfonic acid | 7790-94-5 | Chlorosulfuric acid, CSA | | (F)AG/N95 | HCl, SO ₂ hydrolysis products |
| 2-Chloro-1,1,1,2-tetrafluoroethane | 2837-89-0 | Chlorotetrafluoroethane, Fluorocarbon 124, HCFC124, HFA124 | | SA | Short OV service life |
| o-Chlorotoluene | 95-49-8 | 2-Chloro-1-methylbenzene | | OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---------------------------------|------------|--|-------|------------|--|
| Chlorotrifluoro-ethylene | 79-38-9 | CFE, CTFE, Trifluorochloroethylene, Trifluorovinylchloride | | SA | Short OV service life |
| Chromium (II) compounds (as Cr) | | | | N95 | |
| Chromium III compounds (as Cr) | | | | N95 | |
| Chromium (VI) compounds (as Cr) | | Chromic acid, Hexavalent chromium compounds | Y | N95 | Skin notation for water-soluble compounds |
| Chromium metal | 7440-47-3 | | | N95 | |
| Chromyl chloride | 14977-61-8 | Chloro-chromic anhydride, Chromium oxychloride | Y | (F)AG/N95 | See comment E in Introduction |
| Citral | 5392-40-5 | 2,6-Octadienal-3,7-dimethyl; 3,7-Dimethyl-2,6-octadienal | Y | OV/P95 | See comment D in Introduction |
| Coal dust, Anthracite | | | | N95 | May also contain crystalline silica (quartz) |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|------------|--|-------|------------|---|
| Coal dust, Bituminous or Lignite | | | | N95 | May also contain crystalline silica (quartz) |
| Coal tar pitch volatiles (as Benzene solubles) | 65996-93-2 | Particulate polycyclic aromatic hydrocarbons, PPAH | | R95 P95 | Respirators with nuisance level organic vapor or acid gas relief specifically recommended |
| Cobalt, elemental and inorganic compounds (as Co) | 7440-48-4 | | | N95 | |
| Cobalt carbonyl (as Co) | 10210-68-1 | | | SA | Ineffective sorbents |
| Cobalt hydrocarbonyl (as Co) | 16842-03-8 | | | SA | Ineffective sorbents |
| Coke oven emissions | 65996-93-2 | | | R95 P95 | Respirators with nuisance level organic vapor or acid gas relief specifically recommended |
| Copper dust and mist (as Cu) | 7440-50-8 | | | N95 | |
| Copper fume (as Cu) | 7440-50-8 | | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|----------------------|------------|--|-------|------------|--|
| Cotton dust, raw | | | | N95 | 5X PEL maximum for disposables, per OSHA cotton dust standard. If oil aerosol present, use R or P95. |
| Cresol (all isomers) | 1319-77-3 | Cresylic acid | Y | OV/P95 | See comment D in Introduction. 3M Organic Vapor Monitors. |
| Crotonaldehyde | 4170-30-3 | b-Methylacrolein, Crotonic aldehyde, Propylene aldehyde | | (F)OV | 3M Formaldehyde Monitors |
| Cryolite (as F) | 15096-52-3 | Greenland spar, Icetone | | N95 | |
| Cumene | 98-82-8 | 2-Phenyl propane, Cumol, Isopropyl benzene | | OV | 3M Organic Vapor Monitors |
| Cumene hydroperoxide | 80-15-9 | a,a'-Dimethylbenzyl hydroperoxide, CHP, Cumyl hydroperoxide, Isopropyl benzene hydroperoxide | Y | (F)OV | |
| Cyanamide | 420-04-2 | Carbodiimide, Cyanogenamide | | N95 | |
| Cyanides (as CN) | | | Y | SA | |
| Cyanogen | 460-19-5 | Dicyan, Oxalonitrile | | MG | |
| Cyanogen bromide | 506-68-3 | Bromine cyanide | | (F)SA | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------|------------|--|-------|------------|--|
| Cyanogen chloride | 506-77-4 | CNCl | | (F)SA | Short OV service life |
| Cyclohexane | 110-82-7 | Hexahydrobenzene, Hexamethylene | | (F)OV | Irritation also provides warning. 3M Organic Vapor Monitors. |
| Cyclohexanol | 108-93-0 | Anol, Cyclohexyl alcohol, Hexahydrophenol, Hexalin, Hydralin, Hydroxycyclohexane | Y | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Cyclohexanone | 108-94-1 | Cyclohexyl ketone, Pimelic ketone | Y | OV | 3M Organic Vapor Monitors |
| Cyclohexene | 110-83-8 | Benzene tetrahydride | | OV | |
| Cyclohexylamine | 108-91-8 | Aminocyclohexane, Hexahydroaniline | | (F)OV | |
| Cyclonite | 121-82-4 | Hexahydro-1,3,5-trinitro-sym-triazine; RDX; sym-Trimethylene trinitramine | Y | N95 | |
| Cyclopentadiene | 542-92-7 | 1,3-Cyclopentadiene | | OV | Short service life |
| Cyclopentane | 287-92-3 | Pentamethylene | | SA | Short OV service life |
| Decaborane | 17702-41-9 | Decaborane | Y | SA | Unknown sorbent effectiveness |
| Decabromodiphenyl oxide | 1163-19-5 | bis-(Pentabromophenyl) ether, DBDPO, Decabromodiphenyl ether | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------|------------|---|-------|------------|---|
| 1-Decene | 872-05-9 | a-Decene, Decylene | | OV | |
| Dehydrolinalool | 29171-20-8 | | | OV | |
| Diacetone alcohol | 123-42-2 | 2-Methyl-2-pentanol-4-one, 4-Hydroxy-4-methyl-2-pentanone, Diacetone | | (F)OV | 3M Organic Vapor Monitors |
| Diacetyl | 431-03-8 | Biacetyl, 2,3-Butanedione, 2,3-Diketobutane, Dimethyl diketone, Dimethylglyoxal | | OV/P95 | |
| Diallylamine | 124-02-7 | Di-2-propenylamine, N-2-propenyl-2-propen-1-amine | Y | OV | |
| Diazomethane | 334-88-3 | Azimethylene, Diazirine | | SA | Unknown sorbent effectiveness |
| Diborane | 19287-45-7 | Boroethane | | SA | Unknown sorbent effectiveness |
| Dibromochloro-propane | 96-12-8 | 1,2-Dibromo-3-chloropropane; 1-Chloro-2,3-dibromopropane; DBCP | | (F)SA | OSHA requires (F)SA; no change schedule allowed |
| Dibromoneopenytl glycol | 3296-90-0 | Dibromopentaerythritol | | (F)R95/P95 | R95/P95 acceptable with appropriate eye/face protection |
| Dibutylamine | 111-92-2 | 1-Butanamine, n-butyl; Di-n-butylamine; DNBA | Y | (F)OV | See comment E in Introduction |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------------|-----------|---|-------|------------|---|
| 2-N-Dibutylamino-ethanol | 102-81-8 | Dibutylaminoethanol, N,N-Dibutyl-N-(2-hydroxyethyl) amine | Y | (F)OV | |
| Dibutyl phenyl phosphate | 2528-36-1 | DBPP | Y | R95 P95 | OV/P95 may be preferable if heat involved |
| Dibutyl phosphate | 107-66-4 | Dibutyl acid-o-phosphate, Dibutyl phosphoric acid, Di-n-butyl hydrogen phosphate | Y | OV/P95 | See comment D in Introduction |
| Dibutyl phthalate | 84-74-2 | 1,2-Benzene dicarboxylate, DBP, Dibutyl | | OV/P95 | See comment D in Introduction |
| Dichloroacetic acid | 79-43-6 | 2-2-Dichloroacetic acid; Acetic acid, dichloro; Dichloroethanoic acid; Urmer's liquid | Y | (F)OV/AG | |
| Dichloroacetylene | 7572-29-4 | Dichloroethyne | | (F)SA | Short OV service life |
| o-Dichlorobenzene | 95-50-1 | 1,2-Dichlorobenzene, o-Dichlorobenzol | | (F)OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| p-Dichlorobenzene | 106-46-7 | 1,4-Dichlorobenzene, Dichloride, PDCB | | (F)OV/N95 | 3M Organic Vapor Monitors |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|----------------------------------|---|-------|------------|--|
| 1,4-Dichloro-2-butene | 764-41-0 | 2-Butylenedichloride, DCB, 1,4-DCB, Dichlorobutene | Y | (F)OV | |
| Dichlorodifluoro -methane | 75-71-8 | Freon® 12, Refrigerant 12 | | SA | Short OV service life |
| 1,3-Dichloro-5,5- dimethyl hydantoin | 118-52-5 | Dactin, Halane | | OV/N95 | |
| 1,1-Dichloroethane | 75-34-3 | Ethylidene chloride | | OV | Short service life. 3M Organic Vapor Monitors. |
| 1,2-Dichloro -ethylene | 540-59-0 156-59-2 156-60-5 | Acetylene dichloride, Dioform | | OV | Short service life. 3M Organic Vapor Monitors. |
| Dichloroethyl ether | 111-44-4 | 2,2'-Dichlorodiethyl ether, bis-(2-Chloroethyl) ether | Y | (F)OV | |
| 1,1-Dichloro-1- fluoroethane | 1717-00-6 | Fluorocarbon 141b, HCFC 141b, HFA 141b | | SA | Short OV service life |
| Dichlorofluoro -methane | 75-43-4 | Dichloromonofluoromethane, Freon® 21, Refrigerant 21 | | SA | Short OV service life |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------------|--|---|-------|------------|---|
| 1,1-Dichloro-1-nitroethane | 594-72-9 | | | OV | |
| 2,4-Dichlorophenol | 120-83-2 | 2,4-DCP, DCP | Y | OV | R or P95 may also be needed if material is molten |
| 1,3-Dichloropropene | 542-75-6 | 1,3-Dichloropropylene | Y | (F)OV | |
| 2,2-Dichloropropionic acid | 75-99-0 | Dalapon™ | | (F)OV/N95 | |
| Dichlorotetrafluoro-ethane | 76-14-2 | FC-114, Freon® 114, Halon™ 242, Refrigerant 114 | | SA | Short OV service life |
| Dicyclopentadiene | 77-73-6 | | | OV/N95 | 3M Organic Vapor Monitors |
| Dicyclopentadienyl iron (as Fe) | 102-54-5 | bis-Cyclopentadienyl iron | | N95 | |
| Diesel fuel (as total hydrocarbons) | 68334-30-5 68476-30-2 68476-31-3 68476-34-6 77650-28-3 | Astral oil, Coal oil, Fuel oil, Gas oil, Home heating oil, Marine diesel fuel | Y | OV/P95 | See comment E in Introduction |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------------------|------------|---|-------|----------------|--|
| Diethanolamine | 111-42-2 | Butadiene Dioxide; DEA; N,N-Diethanolamine; 2,2'-Dihydroxydiethylamine; di-(2-Hydroxyethyl)amine; Diolamine; 2,2'-Iminobisethanol | Y | OV/N95 | See comment E in Introduction |
| Diethylamine | 109-89-7 | | Y | (F)AM (F)OV | AM not specifically approved, but 3M recommended for longer service life |
| 2-Diethylaminoethanol | 100-37-8 | 2-Diethylaminoethyl alcohol, N,N-Diethylethanolamine | Y | OV | |
| Diethylbenzenes, mixed | 25340-17-4 | 1,2-Diethylbenzene, 1,3-Diethylbenzene, 1,4-Diethylbenzene, DEB, Dowtherm™ J | | OV | |
| Diethylene glycol | 111-46-6 | 2,2'-Dihydroxydiethyl ether, DEG, Digycol | | R95 P95 | See comments D and G in Introduction |
| Diethylene glycol monobutyl ether | 112-34-5 | Butoxy diethylene glycol, Butoxydiglycol, Butyl Carbitol® | | (F)OV/P95 | See comment D in Introduction. 3M Organic Vapor Monitors. |
| Diethylene glycol monoethyl ether | 111-90-0 | 2-(2-Ethoxyethoxy) ethanol, Carbitol®, DiEGEE, Diethylene glycol ethyl ether, Dioxitol, Ethyl Carbitol®, Glycol ether DE | | OV | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------------|-----------|--|-------|------------|---------------------------|
| Diethylene triamine | 111-40-0 | | Y | (F)OV | |
| N,N-Diethylhydroxylamine | 3710-84-7 | DEHA | | OV | |
| Diethyl ketone | 96-22-0 | 3-Pentanone, Ethyl propionyl, Metacetone, Propione | | OV | 3M Organic Vapor Monitors |
| Diethyl phthalate | 84-66-2 | DEP, Ethylphthalate | | R95 P95 | |
| Difluorodibromomethane | 75-61-6 | DFBM, Dibromodifluoromethane, Freon® 12B2 | | OV | Short service life |
| 1,1-Difluoroethane | 75-37-6 | Dymel® 152a, Ethylidene fluoride, Freon® 152a, Genetron™ 152a, HFC-152a | | SA | Ineffective sorbents |
| Difluoromethane | 75-10-5 | Hydrofluorocarbon 32, R32, Refrigerant 32 | | SA | Ineffective sorbents |
| Diglycidyl ether | 2238-07-5 | 2-Epoxypropyl ether, bis-(2,3-Epoxypropyl)-ether, DGE, Di-(epoxypropyl) ether, Diallyl ether dioxide | | (F)OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------------|------------|--|-------|------------|--|
| Diisobutylene (mixed isomers) | 25167-70-8 | Diisobutene | | OV | |
| a-Diisobutylene | 107-39-1 | 2,4,4-Trimethyl-1-pentene, a-Diisobutene | | OV | |
| b-Diisobutylene | 107-40-4 | 2,4,4-Trimethyl-2-pentene, b-Diisobutene | | OV | |
| Diisobutyl ketone | 108-83-8 | 2,6-Dimethyl-4-heptanone, Isovalerone, sym-Diisopropylacetone, Valerone | | (F)OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Diisopropylamine | 108-18-9 | | Y | (F)OV | |
| Dimethyl acetamide | 127-19-5 | DMAC, N,N-Dimethyl acetamide | Y | OV | |
| Dimethylamine | 124-40-3 | Anhydrous dimethylamine | | AM | AM not specifically approved, but 3M recommended for longer service life |
| bis-(2-Dimethylaminoethyl) ether | 3033-62-3 | DMAEE; Ethylamine, 2,2"-Oxybis (N,N- dimethyl); Niax® Catalyst A-99 | Y | (F)OV | |
| Dimethylaniline | 121-69-7 | N,N-Dimethylaniline | Y | OV | 3M Organic Vapor Monitors |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------------|---|---|-------|------------|-------------------------------|
| Dimethyl carbamoyl chloride | 79-44-7 | Chloroformic acid dimethylamide, Dimethyl carbamic chloride, Dimethylcarbamyl chloride, DMCC | Y | (F)MG | |
| Dimethyldichlorosilane | 75-78-5 | Dichlorodimethylsilane | | OV/AG | |
| Dimethyl disulfide | 624-92-0 | 2,3-Dithiabutane, Dimethyldisulfide, Dimethylsulphide, DMDS | Y | OV/AG | |
| Dimethyl ether | 115-10-6 | Methyl ether, Wood ether | | SA | Short OV service life |
| Dimethylethoxysilane | 14857-34-2 | Ethoxydimethyl silane | | (F)SA | Unknown sorbent effectiveness |
| Dimethyl formamide | 68-12-2 | DMF, N,N-Dimethyl formamide | Y | (F)OV | 3M Organic Vapor Monitors |
| 1,1-Dimethylhydrazine | 57-14-7 | UDMH, unsym-Dimethylhydrazine | Y | (F)AM | |
| Dimethylphenol | 562-75-0, 105-67-9, 95-87-4, 576-26-1, 95-65-8, 108-68-9, 1300-71-6 | 2,3-Dimethylphenol, 2,4-Dimethylphenol, 2,5-Dimethylphenol, 2,6-Dimethylphenol, 3,4-Dimethylphenol, 3,5-Dimethylphenol | | (F)OV/N95 | See comment D in Introduction |
| Dimethylphthalate | 131-11-3 | DMP | | OV/P95 | See comment D in Introduction |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------------|---|--|-------|------------|---|
| Dimethyl sulfide | 75-18-3 | DMS; Methane, thiobis; Thiobis (methane) | | OV/AG | AG recommended since H ₂ S may also be present |
| Dimethyl sulfoxide | 67-68-5 | DMSO, Methylsulfoxide | | OV | 3M Organic Vapor Monitors |
| Dimethylsulfate | 77-78-1 | Methyl sulfate | Y | (F)OV | |
| Dimethyl terephthalate | 120-61-6 | 1,4-Benzenedicarboxylic acid, dimethyl ester; Dimethyl para-phthalate; DMT | | OV/N95 | |
| N,N-Dimethyl-para-toluidine | 99-97-8 | 4-Dimethylaminotoluene, DMPT, N,N,4-Trimethylaniline, N,N,4-Trimethylbenzenamine | | OV | |
| Dinitrobenzene | 528-29-0 99-65-0 100-25-4 25154-54-5 | 1,2-Dinitrobenzene, 1,3-Dinitrobenzene, 1,4-Dinitrobenzene, m-Dinitrobenzene, o-Dinitrobenzene, p-Dinitrobenzene | Y | OV/N95 | See comment D in Introduction |
| 3,5-Dinitro-o-toluamide | 148-01-6 | 2-Methyl-3,5-dinitrobenzamide, Coccidin, Dinitolmide, Salcostat, Zoalene | | N95 | |
| Dinitrotoluene | 25321-14-6 | DNT | Y | OV/N95 | See comment D in Introduction |

NOTE: See important warnings, definitions, and explanation of column headings and abbreviations starting on page 1. For occupational exposure limits, please see your local regulatory authority. In the US, please see <https://www.osha.gov/annotated-pels>.

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---------------------------------|------------|---|-------|------------|---|
| Di-sec-octyl phthalate | 117-81-7 | bis(2-Ethylhexyl) phthalate, DEHP, Di-2-ethylhexyl phthalate, DOP | | R95 P95 | |
| 1,3-Dioxalane | 646-06-0 | 1,3-Dioxacyclopentane; 1,3-Dioxalan; 1,3-Dioxole, dihydroethylene glycol formal; Dioxalane; Formal glycol; Glycol methylene ether; Glycolformal | | OV | 3M Organic Vapor Monitors |
| Dioxane | 123-91-1 | 1,4-Dioxane, Diethylene dioxide, Diethylene ether, p-Dioxane | Y | OV | 3M Organic Vapor Monitors |
| Diphenylamine | 122-39-4 | DPA, N-Phenylaniline | | N95 | OV/N95 may be preferable when odor is a problem |
| Dipropylene glycol methyl ether | 34590-94-8 | bis(2-Methoxypropyl) ether, Dipropylene glycol monomethyl ether, Dowanol™ 50B | Y | OV | 3M Organic Vapor Monitors |
| Dipropyl ketone | 123-19-3 | 4-Heptanone, Butyrane | | OV | |
| Divinyl benzene | 1321-74-0 | DVB, Vinylstyrene | | (F)OV | |
| Dodecyl mercaptan | 112-55-0 | 1-Dodecanethiol, 1-Mercaptododecane, n-Dodecyl mercaptan, n-Lauryl mercaptan | | OV | R or P filter may be needed with oily aerosols |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------|------------|---|-------|------------|--|
| Dowtherm™ Q | | 1,1-Diphenylethane with ethylated benzenes | | OV/P95 | |
| Emery | 1302-74-5 | Corundum | | N95 | |
| Enflurane | 13838-16-9 | 2-Chloro-1,1,2-trifluoroethyl difluoromethyl ether, Ethrane | | SA | Short OV service life |
| Epichlorohydrin | 106-89-8 | 1-Chloro,2,3-epoxypropane, 2-Chloropropylene oxide, gamma-Chloropropylene oxide | Y | (F)OV | 3M Organic Vapor Monitors |
| Erythromycin | 114-07-8 | Dotycin, E-Mycin, Erycinum, Erycin, Pentadecanoic acid | | N95 | |
| Ethane | 74-84-0 | Ethylhydride, Methyl methane | | | Simple asphyxiant, oxygen displacing gas |
| Ethanolamine | 141-43-5 | 2-Aminoethanol, 2-Hydroxyethylamine, b-Aminoethyl alcohol, Ethylolamine, Monoethanolamine | | OV | |
| 2-Ethoxyethanol | 110-80-5 | Cellosolve® solvent, Ethylene glycol monoethyl ether, Glycol monoethyl ether | Y | OV | 3M Organic Vapor Monitors |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------|----------|--|-------|------------|--|
| 2-Ethoxyethyl acetate | 111-15-9 | Cellosolve® acetate, Ethylene glycol monoethyl ether acetate | Y | OV | |
| Ethyl acetate | 141-78-6 | Acetic ester, Acetic ether, Ethyl ethanoate | | (F)OV | 3M Organic Vapor Monitors |
| Ethyl acrylate | 140-88-5 | Acrylic acid ethyl ester | Y | (F)OV | 3M Organic Vapor Monitors |
| Ethyl alcohol | 64-17-5 | Ethanol | | OV | Short OV service life. 3M Organic Vapor Monitors. |
| Ethylamine | 75-04-7 | Aminoethane, Anhydrous ethylamine, Monoethylamine | Y | (F)AM | AM not specifically approved, but 3M recommended for longer service life |
| Ethyl amyl ketone | 541-85-5 | 5-Methyl-3-heptanone, EAK | | (F)OV | |
| Ethyl benzene | 100-41-4 | Ethylbenzol, Phenylethane | | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Ethyl benzene | 100-41-4 | Ethylbenzol, Phenylethane | | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Ethyl bromide | 74-96-4 | Bromoethane | Y | SA | Short OV service life |
| Ethyl butyl ketone | 106-35-4 | 3-Heptanone | | OV | See comment E in Introduction |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------------|-----------|--|-------|------------|---------------------------|
| Ethyl chloride | 75-00-3 | Chloroethane, Hydrochloric ether, Monochloroethane | Y | SA | Short OV service life |
| Ethyl cyanoacrylate | 7085-85-0 | 2-Cyano-2-propenoic acid, ethyl ester; 2-Cyanoacrylic acid, ethyl ester; ECA; Ethyl 2-cyano-2-propenoate; Ethyl 2-cyanoacrylate; Ethyl alpha-cyanoacrylate | | (F)OV | |
| Ethyl tert-butyl ether | 637-92-3 | 1,1-Dimethyl ethyl ether, 2-Ethoxy-2-methylpropane; ETBE; Ethyl 1,1-dimethylethyl ether; Ethyl tert-butyl oxide; tert-Butyl ethyl ether | | OV | |
| Ethylene | 74-85-1 | Acetene, Bicarburretted hydrogen, Elayl, Ethene, Olefiant gas | | (F)SA | |
| Ethylene chlorohydrin | 107-07-3 | 2-Chloroethanol, 2-Chloroethyl alcohol | Y | OV | 3M Organic Vapor Monitors |
| Ethylenediamine | 107-15-3 | 1,2-Diaminoethane, 1,2-Ethanediamine | | (F)OV | |
| Ethylene dibromide | 106-93-4 | 1,2-Dibromoethane | Y | (F)OV | 3M Organic Vapor Monitors |
| Ethylene dichloride | 107-06-2 | 1,2-Dichloroethane, Ethylene chloride | | OV | 3M Organic Vapor Monitors |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---------------------------|------------|--|-------|------------|--|
| Ethylene glycol | 107-21-1 | 1,2-Ethanediol | | OV/P95 | See comments D and G in Introduction |
| Ethylene glycol dinitrate | 628-96-6 | Glycol dinitrate, Nitroglycol | Y | OV | |
| Ethyleneimine | 151-56-4 | Aminoethylene, Azirane, Aziridine, Dihydroazirine, Dimethylenimine, Ethyleimine | Y | (F)MG | OSHA requires SA with hood for certain applications; see 29 CFR 1910.1003 |
| Ethylene oxide | 75-21-8 | 1,2-Epoxyethane, Dimethylene oxide, Oxirane | | (F)SA | OSHA requires (F)SA; no change schedule allowed. 3M Ethylene Oxide Monitors. |
| Ethyl ether | 60-29-7 | Diethyl ether, Ether, Ethyl oxide | | OV | Short service life. 3M Organic Vapor Monitors. |
| Ethyl formate | 109-94-4 | Ethyl methanoate, Formic acid ethyl ester | | (F)OV | Short service life |
| 2-Ethylhexanoic acid | 149-57-5 | 2-Butylbutanoic acid, Butylethylacetic acid, 2-Ethylcaproic acid, 2-Ethylhexoic acid, Ethylhexoic acid | | OV/N95 | See comment D in Introduction |
| Ethylidene norbornene | 16219-75-3 | ENB | | (F)OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------|------------|---|-------|------------------|---|
| Ethyl isocyanate | 109-90-0 | Isocyanatoethene; Isocyanic acid, ethyl ester | Y | OV | Short service life |
| Ethyl mercaptan | 75-08-1 | Ethanethiol, Ethyl sulfhydrate | | OV | Short service life |
| N-Ethylmorpholine | 100-74-3 | 4-Ethylmorpholine | Y | (F)OV | |
| Ethyl silicate | 78-10-4 | Ethyl orthosilicate, Tetraethoxysilane, Tetraethyl silicate | | OV | |
| Ferrovandium dust | 12604-58-9 | | | N95 | |
| Flour dust | | | | N95 | |
| Fluorides (as F) | | (Synonyms vary depending upon specific compound.) | | N95 | |
| Fluorine | 7782-41-4 | | | (F)SA | Unknown reaction products with sorbent |
| Formaldehyde | 50-00-0 | Formalin, Methylene oxide | | (F)Form | Irritation also provides warning. 3M Formaldehyde Monitors. |
| Formamide | 75-12-7 | Methanamide | Y | OV | |
| Formic acid | 64-18-6 | Hydrogenecarboxylic acid, Methanoic acid | | (F)AG (F)Form | Low IDLH |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------------|------------|---|-------|------------|-------------------------------|
| Furfural | 98-01-1 | 2-Furaldehyde, 2-Furancarboxaldehyde, Fural, Furfuraldehyde | Y | (F)OV | |
| Furfuryl alcohol | 98-00-0 | 2-Furylmethanol, 2-Hydroxymethylfuran | Y | (F)OV | See comment E in Introduction |
| Gallium arsenide | 1303-00-0 | Gallium monoarsenide | | N100 | |
| Gasoline | 86290-81-5 | Petrol | | (F)OV | |
| Germanium tetrahydride | 7782-65-2 | Germane, Germanium hydride | | (F)SA | Unknown sorbent effectiveness |
| Glutaraldehyde | 111-30-8 | 1,5-Pentanedial | | (F)OV | See comment E in Introduction |
| Glycerin mist | 56-81-5 | Glycerol | | R95 P95 | |
| Glycidol | 556-52-5 | 2,3-Epoxy-1-propanol, 2-Hydroxymethyloxiran, 3-Hydroxypropylene oxide, Epoxypropyl alcohol, Hydroxymethyl ethylene oxide | | OV | |
| Glycidyl methacrylate | 106-91-2 | 1-Propanol, 2-3, epoxy-, ethacrylate; 2,3-Epoxypropyl methacrylate; 2-Methyl-2-propenoic acid, oxiranylmethyl ester; GMA; Methacrylic acid, 2,3-Epoxypropyl ester | Y | OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|--|--|-------|------------|---|
| Glyoxal | 107-22-2 | 1,2-Ethanedione, Biformyl, Diformyl, Ethanedial, Glyoxalaldehyde, Oxalaldehyde | | (F)OV/N95 | Short OV service life at 10X OEL. See comment E in Introduction |
| Grain dust (oat, wheat, barley) | | | | N95 | |
| Graphite (natural) | 7782-42-5 | Black lead, Corbo minerals, Plumbago, Potelot, Silver lead | | N95 | |
| Graphite (synthetic) | 7440-44-0 | | | N95 | |
| Hafnium and compounds (as Hf) | 7440-58-6 | | | N95 | |
| Halothane | 151-67-7 | 2-Bromo-2-chloro-1,1,1-trifluoroethane | | OV | Short service life |
| Hard metals containing cobalt and tungsten | | | | N95 | |
| Heptane, all isomers | 142-82-5 590-35-2 565-59-3 108-08-7 591-76-4 589-34-4 | n-Heptane, normal Heptane | | OV | 3M Organic Vapor Monitors |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------|-----------|---|-------|------------|-------------------------------|
| Hexachlorobenzene | 118-74-1 | Perchlorobenzene | Y | N95 | |
| Hexachlorobutadiene | 87-68-3 | Hexachloro-1,3-butadiene, Perchlorobutadiene | Y | (F)OV | |
| Hexachlorocyclopentadiene | 77-47-4 | | | (F)OV | |
| Hexachloroethane | 67-72-1 | Perchloroethane | Y | OV/N95 | |
| Hexachloronaphthalene | 1335-87-1 | Halowax™ 1014 | Y | OV/N95 | See comment D in Introduction |
| 1,4-Hexadiene | 592-45-0 | 1-Allylpropene | | OV | |
| Hexafluoroacetone | 684-16-2 | 1,1,1,3,3,3-Hexafluoro-2-propanone | Y | SA | Short OV service life |
| 1,1,1,3,3,3-Hexafluoropropane | 690-39-1 | FC-236fa, FE-13, HFC-236fa, Hydrofluorocarbon 236fa | | SA | Ineffective sorbents |
| Hexafluoropropylene | 116-15-4 | 1,1,2,3,3,3-Hexafluoro-1-propene; 1,1,2,3,3,3-Hexafluoropropylene; Fluorocarbon 1216; Hexafluoropropene; HFP; Perfluoro-1-propene; Perfluoropropene; Perfluoropropylene | | SA | Short OV service life |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|-------------------------------------|---|-------|------------|-------------------------------|
| Hexahydrophthalic anhydride, All isomers | 85-42-7 13149-00-3 14166-21-3 | 1,2-Cyclohexanedicarboxylic acid anhydride; 1,2-Cyclohexanedicarboxylic anhydride; 1,3-Isobenzofurandione, hexahydro; Cyclohexane-1,2-dicaboxylic anhydride, cis and trans mixture; Hexahydro-1,3-isobenzofurandione; Hexahydrophthalic acid anhydride; HHPA; HHPAA | | OV/N95 | See comment D in Introduction |
| Hexamethylene diisocyanate | 822-06-0 | HDI | | OV/N95 | |
| Hexamethylene -tetramine | 100-97-0 | Methenamine, Hexamine, Hexamethylenamine, HMT, HMTA, Foramine, Urotropin | | MG/N95 | |
| Hexane (n-hexane) | 110-54-3 | Hexyl hydride, Normal hexane | Y | OV | 3M Organic Vapor Monitors |
| Hexane (other isomers) | | | | OV | |
| 1,6-Hexanediamine | 124-09-4 | 1,6-Diaminohexane, Hexamethylenediamine, HMD, HMDA | | OV/N95 | |
| Hexanediol diacrylate | 13048-33-4 | HDODA; Propenoic acid,1,6-hexanediol ester | | OV/P95 | See comment D in Introduction |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------|----------------------------|--|-------|------------|-----------------------------------|
| 1-Hexene | 592-41-6 | Butyl ethylene, Hex-1-ene, Hexene, Hexene-n-1, Hexylene | | OV | Short service life |
| sec-Hexyl acetate | 108-84-9 | 1,3-Dimethylbutyl acetate, Methylamyl acetate, Methylisoamyl acetate, Methylisobutyl carbinol | | (F)OV | See comment E in Introduction |
| Hexylene glycol | 107-41-5 | 2-Methyl-2,4-pentanediol | | (F)OV/P95 | Irritation also provides warning |
| HFE-7100 | 163702-08-7 163702-07-6 | 60% of mixture is: 1-Methoxy-2-trifluoromethyl-1,1,2,3,3,3-hexafluoropropane; 1-Methoxyperfluoroisobutane 40% of mixture is: 1-Methoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane; 1-Methoxyperfluorobutane | | OV | Short service life |
| Hydrazine | 302-01-2 | Anhydrous hydrazine | Y | (F)AM | |
| Hydrogenated terphenyls | 61788-32-7 | Hydrogenated terphenyls | | R95 P95 | |
| Hydrogen bromide | 10035-10-6 | HBr, Hydrobromic acid | | AG | Not specifically approved for HBr |
| Hydrogen chloride | 7647-01-0 | HCl, Hydrochloric acid, Muriatic acid | | AG | Irritation also provides warning |
| Hydrogen cyanide | 74-90-8 | Hydrocyanic acid, Prussic acid | Y | (F)SA | Low IDLH |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------------------|------------|---|-------|---------------|--|
| Hydrogen fluoride | 7664-39-3 | Anhydrofluoric acid, Etching acid, Fluoric acid, Fluorohydric acid, HF | Y | (F)HF | |
| Hydrogen peroxide | 7722-84-1 | Hydrogen dioxide, Peroxide | | (F)OV | See technical data bulletin 185 |
| Hydrogen selenide (as Se) | 7783-07-5 | Selenium hydride | | (F)MG | |
| Hydrogen sulfide | 7783-06-4 | H ₂ S, Hepatic gas, Hydrosulfuric acid, Sulfuretted hydrogen | | AG | Poor warning (olfactory fatigue) |
| Hydroquinone | 123-31-9 | 1,4-Benzenediol, Dihydroxybenzene, Quinol | | (F)OV/N95 | See comment D in Introduction |
| 4-Hydroxybenzoic acid | 99-96-7 | | | (F)N95 | |
| 2-Hydroxypropyl acrylate | 999-61-1 | HPA | Y | OV | |
| Indene | 95-13-6 | Indonaphthene | | OV | |
| Indium and compounds (as In) | 7440-74-6 | | | N95 | |
| Indium tin oxide | 50926-11-9 | | | N95 | 90:10 mixture of In ₂ O ₃ and SnO ₂ |
| Iodides | | | | (F)MG/ N95 | See comment E in Introduction |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------------|------------|---|-------|---------------|---|
| Iodine | 7553-56-2 | | | (F)MG/ N95 | See comment E in Introduction |
| Iodoform | 75-47-8 | Triiodomethane | | (F)OV | |
| Iron oxide | 1309-37-1 | Burnt sienna, Burnt umber, Ferric oxide, Hematite, Jeweler's rouge, Rouge | | N95 | |
| Iron oxide fume | 1309-37-1 | Ferric oxide fume | | N95 | |
| Iron pentacarbonyl (as Fe) | 13463-40-6 | Iron carbonyl | | SA | Unknown sorbent effectiveness |
| Iron salts, soluble (as Fe) | | Ferric chloride; Ferric nitrate; Ferric sulfate; Ferric/Ferrous salts, soluble; Ferrous chloride; Ferrous sulfate | | N95 | |
| Isoamyl alcohol | 123-51-3 | 3-Methyl-1-butanol, Fusel oil, Isobutyl carbinol, Isopentyl alcohol | | (F)OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Isobutane | 75-28-5 | 2-Methyl propane, Methylpropane | | SA | Short OV service life |
| Isobutene | 115-11-7 | 1,1-Dimethylethene, 1,1-Dimethylethylene, 2-Methylpropene, 2-Methylpropylene, Isobutylene | | OV | Short service life |
| Isobutyl acetate | 110-19-0 | 2-Methylpropyl acetate | | (F)OV | 3M Organic Vapor Monitors |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------|------------|---|-------|------------|---|
| Isobutyl alcohol | 78-83-1 | 2-Methyl-1-propanol, IBA, Isobutanol, Isopropylcarbinol | | (F)OV | 3M Organic Vapor Monitors |
| Isobutyl nitrite | 542-56-3 | IBN; Nitrous acid, 2-methylpropyl ester; Nitrous acid, isobutyl ester | | OV | |
| Isobutyraldehyde | 78-84-2 | 2-Methyl-1-propanal, 2-Methylpropanal, 2-Methylpropionaldehyde, Isobutanal, Isobutyl aldehyde, Isobutyric aldehyde, Valine aldehyde | | OV | Short service life |
| Isocyanuric acid | 108-80-5 | Cyanuric acid, s-Triazine-2,4,6(1H,3H,5H)-trione, s-Triazinetriol | | N95 | AM/N95 may be preferable if wet |
| Isooctyl alcohol | 26952-21-6 | Isooctanol | Y | OV | |
| Isoflurane | 26675-46-7 | 1-Chloro-1-(difluoromethoxy)-2,2,2-trifluoroethane, 1-Chloro-2,2,2-trifluoroethyl difluoromethyl ether | | OV | See 3M technical data bulletin |
| Isophorone | 78-59-1 | 3,5,5-Trimethyl-2-cyclohexene-1-one | | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Isophorone diisocyanate | 4098-71-9 | IPDI | | OV/N95 | |
| Isophthalic acid | 121-91-5 | 1,3-Benzenedicarboxylic acid, IA , IPA, m-Phthalic acid | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|-----------|---|-------|----------------|--|
| Isoprene | 78-79-5 | 2-Methyl-1,3-butadiene | | OV | Short service life |
| Isopropoxyethanol | 109-59-1 | Ethylene glycol monoisopropyl ether, IPE, Isopropyl Cellosolve®, Isopropyl glycol | Y | OV | |
| Isopropyl acetate | 108-21-4 | Isopropyl ester of acetic acid, sec-Propyl acetate | | (F)OV | 3M Organic Vapor Monitors |
| Isopropylamine | 75-31-0 | 2-Aminopropane, Monoisopropylamine | | (F)AM (F)OV | AM not specifically approved, but 3M recommended for longer service life |
| N-Isopropylaniline | 768-52-5 | o-Aminoisopropylbenzene, o-Isopropylaniline | Y | OV | |
| Isopropyl ether | 108-20-3 | Diisopropyl ether | | OV | |
| Isopropyl glycidyl ether | 4016-14-2 | 1,2-Epoxy-3-isopropoxy-propane, IGE, Isopropoxymethyl-oxiran, Isopropyl epoxypropyl ether | | (F)OV | |
| Kaolin (particles with no asbestos and <1% crystalline silica) | 1332-58-7 | Aluminium silicate, China clay | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|---------------------------------------|--|-------|------------|--|
| Kerosene (applications with negligible aerosol) | 8008-20-6 64712-81-0 64742-81-0 | Deobase, Diesel No.1, Fuel oil No. 1, JP-4, JP-5, JP-8, Hydrotreated kerosene, Kerosine | Y | OV | When aerosols present, add a particulate prefilter |
| Ketene | 463-51-4 | Carbomethene, Ethenone | | (F)SA | Ineffective sorbents |
| Lead arsenate (as As) | 3687-31-8 | | | N100 | |
| Lead chromate (as Cr) | 7758-97-6 | Chromates of lead, Chrome orange, Red lead chromate | | N100 | |
| Lead, elemental and inorganic compounds(as Pb) | 7439-92-1 | | | N100 | |
| d-Limonene | 5989-27-5 | 1-Methyl-4(1-methylethenyl) cyclohexene, 4-Isopropyl-1-methylcyclohexene, Cajeputene, Cinene, p-Mentha-1,8-diene | | OV | 3M Organic Vapor Monitors |
| Lithium fluoride (as F) | 7789-24-4 | | | N95 | |
| Lithium hydride | 7580-67-8 | | | N95 | |
| Lithium hydroxide | 1310-65-2 | | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|---|-------|------------|---|
| Lithium hydroxide monohydrate | 1310-66-3 | | | N95 | |
| Lithium oxide | 12057-24-8 | Dilithium oxide, Lithium monoxide | | N95 | |
| LPG | 68476-85-7 | Bottled gas, Liquefied petroleum gas | | SA | Mixture with compounds with short OV service life |
| Magnesite | 546-93-0 | Magnesium carbonate | | N95 | |
| Magnesium oxide fume | 1309-48-4 | Magnesia fume | | N95 | |
| Maleic anhydride | 108-31-6 | 2,5-Furandione, cis-Butenedioic anhydride, Maleic acid anhydride | | (F)OV/N95 | See comment D in Introduction |
| Manganese cyclopentadienyl tricarbonyl | 12079-65-1 | MCT | Y | SA | Properties of vapor unknown |
| Manganese, elemental and inorganic compounds (as Mn) | 7439-96-5 | | | N95 | |
| Melamine | 108-78-1 | 1,3,5-Triazine-2,4,6-triamine, 2,4,6-Triamino-1,3,5-triazine, Cyanuramide | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------------------------|-----------|---|-------|------------|---|
| 2-Mercaptobenzo-thiazole | 149-30-4 | 2-Benzothiazolethiol, 2-Benzothiazolylmercaptan, Benzothiazole-2-thione, Mercaptobenzothiazole | Y | N95 | |
| Mercaptoethanol | 60-24-2 | 1-Hydroxy-2-mercaptoethane, 2-Hydroxy-1-ethanethiol, 2-Hydroxyethylmercaptan, 2ME, 2-Mercaptoethanol, 2-Thioethanol, Thioethyleneglycol, Thioglycol | Y | OV | |
| Mercury, alkyl compounds (as Hg) | | | Y | OV | |
| Mercury, aryl compounds (as Hg) | | | Y | N95 | Dust with essentially no vapor pressure only. |
| Mercury, inorganic compounds (as Hg) | | | Y | N95 | Dust with essentially no vapor pressure only. Hg/N95 for volatile liquids |
| Mercury, metallic mercury vapor | 7439-97-6 | Hg, Quicksilver | Y | Hg | |
| Mesityl oxide | 141-79-7 | Isobutenyl methyl ketone, Isopropylidene acetone, Methyl isobutenyl ketone | | (F)OV | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------------|------------|--|-------|----------------|--|
| Methacrylic acid | 79-41-4 | a-Methacrylic acid | | (F)OV | |
| Methane | 74-82-8 | Biogas, Fire damp, Marsh gas, Methyl hydride, R 50 (refrigerant) | | | Simple asphyxiant, oxygen displacing gas |
| 2-Methoxyethanol | 109-86-4 | Ethylene glycol monomethyl ether, Methyl Cellosolve® | Y | OV | 3M Organic Vapor Monitors |
| 2-Methoxyethyl acetate | 110-49-6 | Ethylene glycol methyl ether acetate, Ethylene glycol monomethyl ether acetate, Methyl Cellosolve® acetate | Y | OV | 3M Organic Vapor Monitors |
| 4-Methoxyphenol | 150-76-5 | Hydroquinone monomethyl ether, p-Methoxyphenol | | N95 | |
| 3-Methoxypropyl amine | 5332-73-0 | 1-Propanimine, 3-methoxy | | (F)OV (F)AM | Irritation also provides warning. AM may be preferred, but not specifically approved |
| Methyl acetate | 79-20-9 | Acetic acid methyl ester, Methyl acetic ester, Methyl ethanoate | | OV | Short service life. 3M Organic Vapor Monitors. |
| Methyl acetylene | 74-99-7 | Allylene, Propyne | | SA | Short OV service life |
| Methyl acetylene propadiene mixture | 59355-75-8 | MAPP gas, Methyl acetylene-allene mixture, Propyne-allene mixture | | SA | Short OV service life |
| Methyl acrylate | 96-33-3 | Methyl propenoate | Y | (F)OV | 3M Organic Vapor Monitors |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|----------------------|----------|---|-------|------------|--|
| Methylacrylonitrile | 126-98-7 | 2-Methyl-2-propenenitrile, Isoprene cyanide | Y | SA | |
| Methylal | 109-87-5 | Dimethoxymethane, Dimethylacetal formaldehyde, Formal, Methyl formal | | SA | |
| Methyl alcohol | 67-56-1 | Carbinol, Methanol, Wood alcohol | Y | SA | Short OV service life. 3M Organic Vapor Monitors. |
| Methylamine | 74-89-5 | Monomethylamine | | (F)AM | |
| Methyl amyl alcohol | 108-11-2 | Methyl isobutyl carbinol | Y | OV | 3M Organic Vapor Monitors |
| Methyl n-amyl ketone | 110-43-0 | 2-Heptanone, Amyl methyl ketone, Methyl amyl ketone, n-Amyl methyl ketone | | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Methylaniline | 100-61-8 | MA, Monomethyl aniline, N-Methyl aniline | Y | OV | |
| Methyl bromide | 74-83-9 | Bromomethane | Y | (F)SA | Short OV service life. Use of 60928 cartridge/filter recommended by 3M, not specifically approved for methyl bromide |
| 2-Methyl-2-butene | 513-35-9 | | | SA | Short OV service life |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|---|--|-------|------------|----------------------------------|
| Methyl tert-butyl ether | 1634-04-4 | 2,2-MMOP, 2-Methoxy-2-methyl-propane, MTBE, tert-Butyl methyl ether | | OV | 3M Organic Vapor Monitors |
| Methyl n-butyl ketone | 591-78-6 | 2-Hexanone, MBK | Y | OV | 3M Organic Vapor Monitors |
| Methyl chloride | 74-87-3 | Chloromethane | Y | SA | Short OV service life |
| Methyl chloroform | 71-55-6 | 1,1,1-Trichloroethane | | OV | 3M Organic Vapor Monitors |
| Methyl 2-cyanoacrylate | 137-05-3 | Mecrylate | | (F)OV | |
| Methylcyclohexane | 108-87-2 | Cyclohexylmethane, Hexahydrotoluene | | OV | 3M Organic Vapor Monitors |
| Methylcyclohexanol | 25639-42-3 | Hexahydrocresols | | OV | |
| Methylcyclohexa- -none, all isomers | 583-60-8 591-24-2 589-92-4 1331-22-2 | 2-Methylcyclohexanone, 3-Methylcyclohexanone, 4-Methylcyclohexanone | Y | (F)OV | Irritation also provides warning |
| 2-Methylcyclopenta- -dienyl manganese tricarbonyl (as Mn) | 12108-13-3 | | Y | OV/N95 | SA preferable if heat involved |
| Methylene bisphenyl isocyanate | 101-68-8 | 4,4-Diphenylmethane diisocyanate, MDI, Methylene-bis-(4-phenyl isocyanate) | | OV/N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---------------------------------------|-----------|---|-------|------------|--|
| Methylene chloride | 75-09-2 | Dichloromethane, Methylene dichloride | | (F)SA | OSHA requires (F)SA; no change schedule allowed. Short OV service life. 3M Organic Vapor Monitors. |
| 4,4'-Methylene-bis-(2-chloroaniline) | 101-14-4 | 4,4'-Methylene-bis-(2-chlorobenzamine), DACPM, MOCA | Y | OV/N95 | See comment D in Introduction |
| Methylene-bis(4-cyclohexylisocyanate) | 5124-30-1 | | | OV/N95 | |
| 4,4'-Methylene dianiline | 101-77-9 | 4,4'-Diaminodiphenylmethane, MDA | Y | N100 | Use OV/N100 if heat is involved. See 29 CFR 1910.1050 |
| Methyl ethyl ketone | 78-93-3 | 2-Butanone, MEK | | (F)OV | 3M Organic Vapor Monitors |
| Methyl ethyl ketone peroxide | 1338-23-4 | MEKP | | (F)OV | |
| Methyl ethyl ketoxime | 96-29-7 | 2-Butanone oxime, MEKO | | OV | 3M Organic Vapor Monitors |
| Methyl formate | 107-31-3 | Formic acid methyl ester, Methyl methanoate | | SA | Short OV service life |
| Methyl hydrazine | 60-34-4 | Monomethyl hydrazine | Y | (F)AM | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------|----------|--|-------|------------------|---|
| Methyl iodide | 74-88-4 | Iodomethane | Y | (F)SA | Short OV service life. Use of 60928 cartridge/filter recommended by 3M, not specifically approved for methyl iodide. 3M Organic Vapor Monitors. |
| Methyl isoamyl ketone | 110-12-3 | 2-Methyl-5-hexanone, 5-Methyl-2-hexanone, MIAK | | (F)OV | 3M Organic Vapor Monitors |
| Methyl isobutyl ketone | 108-10-1 | Hexone, MIBK | | (F)OV | 3M Organic Vapor Monitors |
| Methyl isocyanate | 624-83-9 | Isocyanic acid, methyl ester | Y | SA | Unknown sorbent effectiveness |
| Methyl isopropyl ketone | 563-80-4 | 3-Methyl-2-butanone, MIPK | | (F)OV | |
| Methyl mercaptan | 74-93-1 | Mercaptomethane, Methanethiol, Methyl sulfhydrate, Thiomethyl alcohol | | OV | Short service life |
| Methyl methacrylate | 80-62-6 | 2-Methyl-2-propenoic acid methyl ester; Methacrylic acid, methyl ester; Methyl alpha-methyl-acrylate; Methyl-2-methyl-2-propenoate; Methyl-2-methylpropenoate; MMA | | OV | 3M Organic Vapor Monitors |
| 1-Methylnaphthalene | 90-12-0 | a-Methyl naphthalene, a-Methylnaphthalene | Y | OV/R95 OV/P95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|---|---|-------|------------------|----------------------------------|
| 2-Methylnaphthalene | 91-57-6 | b-Methyl naphthalene, b-Methylnaphthalene | Y | OV/R95 OV/P95 | |
| Methyl propyl ketone | 107-87-9 | 2-Pentanone, Ethyl acetone, MPK | | (F)OV | 3M Organic Vapor Monitors |
| n-Methyl-2-pyrrolidone | 872-50-4 | 1-Methyl-2-pyrrolidone; m-Pyrol; n-Methyl Pyrrolidone; NMP | Y | OV | 3M Organic Vapor Monitors |
| Methyl silicate | 681-84-5 | Tetramethoxy silane | | (F)OV | |
| a-Methyl styrene | 98-83-9 | 1-Methyl-1-phenylethylene, AMS | | OV | See comment E in Introduction |
| Methyltetrahydrod -phthalic anhydride isomers | 3425-89-6, 5333-84-6, 11070-44-3, 19438-63-2, 19438-64-3, 26590-20- 5, 42498- 58-8 | | Y | OV | |
| Methyltrichlorosilane | 75-79-6 | Trichloromethylsilane | | (F)AG/N95 | Irritation also provides warning |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|------------|--|-------|------------|-------------------------------|
| Methyl vinyl ketone | 78-94-4 | 3-Buten-2-one, 3-Butene-2-one, Acetyl ethylene, d(3)-2-Butenone, g-Oxo-a-Butylene, Methyl vinyl acetone, Methylene acetone | | OV | |
| Mica (less than 1% quartz) | 12001-26-2 | | | N95 | |
| Mineral oil, excluding metal working fluids (pure, highly and severely refined) | 8012-95-1 | Liquid petrolatum, Paraffin oil, USP mineral oil, White mineral oil | | R95 P95 | |
| Molybdenum and insoluble compounds (as Mo) | 7439-98-7 | | | N95 | |
| Molybdenum, soluble compounds (as Mo) | 7439-98-7 | | | N95 | |
| Monochloroacetic acid | 79-11-8 | Chloroethanoic acid, MCAA | Y | (F)OV/N95 | See comment D in Introduction |
| Monomethylformamide | 123-39-7 | N-Methylformamide | Y | (F)OV | |
| Morpholine | 110-91-8 | Diethylenimide oxide, Tetrahyrdo-1,4-oxazine | Y | (F)OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|------------|--|-------|------------|---|
| Naphtha (coal tar) | 8030-30-6 | Crude solvent coal tar naphtha, High solvent naphtha, Naphtha, Rubber solvent | | (F)OV | Odor variable. Irritation also provides warning. |
| Naphthalene | 91-20-3 | Naphthalin, White tar | Y | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Natural gas | 8006-14-2 | | | | Simple asphyxiant, oxygen displacing gas |
| Natural rubber latex | 9006-04-6 | Caoutchouc, India rubber, Natural latex, Natural rubber, NRL, Polyisoprene, Rubber | Y | N95 | |
| Nickel carbonyl (as Ni) | 13463-39-3 | Nickel tetracarbonyl | | (F)SA | Unknown sorbent effectiveness |
| Nickel, elemental/metal compounds (as Ni) | 7440-02-0 | | | N95 | |
| Nickel, insoluble inorganic compounds not otherwise specified (as Ni) | | | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|------------|---|-------|------------|-------------------------------|
| Nickel, soluble inorganic compounds not otherwise specified (as Ni) | | | | N95 | |
| Nickel subsulfide (as Ni) | 12035-72-2 | | | N95 | |
| Nicotine | 54-11-5 | 3-(1-Methyl-2-pyrrolidyl) pyridine | Y | OV/P95 | See comment D in Introduction |
| Nitric acid | 7697-37-2 | Aqua fortis, Hydrogen nitrate, Red fuming nitric acid, RFNA, WFNA, White fuming nitric acid | | (F)SA | Ineffective sorbents |
| Nitric oxide | 10102-43-9 | Nitrogen monoxide, NO | | SA | Ineffective sorbents |
| p-Nitroaniline | 100-01-6 | 1-Amino-4-nitrobenzene, 4-Nitroaniline, Azoic diazo component 37, Fast Red GG base, p-Aminonitro-benzene, PNA | Y | OV/N95 | See comment D in Introduction |
| Nitrobenzene | 98-95-3 | Nitrobenzol, Oil of mirbane | Y | OV | |
| p-Nitrochlorobenzene | 100-00-5 | 1-Chloro-4-nitrobenzene, 4-Chloronitrobenzene, PCNB, PNCB | Y | OV | |
| Nitroethane | 79-24-3 | | | (F)OV | |
| Nitrogen dioxide | 10102-44-0 | Nitrogen peroxide | | SA | Ineffective sorbents |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------|-------------------------------|---|-------|------------------|-------------------------------|
| Nitrogen trifluoride | 7783-54-2 | Nitrogen fluoride | | SA | Unknown sorbent effectiveness |
| Nitroglycerin (NG) | 55-63-0 | Glyceryl trinitrate, Trinitroglycerin | Y | OV | |
| Nitromethane | 75-52-5 | Nitrocarbolic acid | | OV | |
| 1-Nitropropane | 108-03-2 | | | OV | |
| 2-Nitropropane | 79-46-9 | sec-Nitropropane | | OV | |
| Nitrotoluene | 88-72-2 99-08-1 99-99-0 | Nitrotoluol | Y | OV/N95 | See comment D in Introduction |
| 5-Nitro-o-toluidine | 99-55-8 | 2-Methyl-5-nitrobenzenamine, 5-Nitro-2-toluidine, Azoic Diazo Compound 12 | | OV/R95 OV/P95 | |
| Nitrous oxide | 10024-97-2 | Dinitrogen monoxide | | SA | Ineffective sorbents |
| Nonane | 111-84-2 | n-Nonane | | OV | 3M Organic Vapor Monitors |
| Octachloronaphthalene | 2234-13-1 | Halowax™ 1051 | Y | OV/N95 | See comment D in Introduction |
| Octane, all isomers | 111-65-9 540-84-1 | n-Octane, Isooctane | | OV | 3M Organic Vapor Monitors |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|--|-------|------------|--|
| 1-Octanol | 111-87-5 | 1-Hydroxyoctane, Alcohol C-8, Capryl alcohol, Heptyl carbinol, n-Octanol, n-Octyl alcohol | | OV | |
| 1-Octene | 111-66-0 | a-Octene, a-Octylene | | OV | |
| Osmium tetroxide (as Os) | 20816-12-0 | Osmic acid | | (F)SA | Unknown sorbent effectiveness |
| Oxalic acid | 144-62-7 | Ethane dioic acid | | OV/N95 | See comment D in Introduction |
| Oxalic acid dihydrate | 6153-56-6 | | | OV/N95 | See comment D in Introduction |
| p,p-Oxybis (benzenesulfonyl hydrazide) | 80-51-3 | Benzenesulfonic acid, 4,4-Oxybis-dihydrazide; Celogen®; Diphenyl ether 4,4'-disulfohydrazide; OBSH | | N95 | |
| Oxygen difluoride | 7783-41-7 | Difluorine monoxide, Fluorine monoxide | | SA | Unknown sorbent effectiveness |
| Ozone | 10028-15-6 | | | OZ | Respirators with nuisance level organic vapor relief recommended by 3M up to 10X OEL. Not NIOSH approved for ozone |
| Paraffin wax fume | 8002-74-2 | | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------------------------|---------------------------------|--|-------|------------|---|
| Particulates Not Otherwise Regulated | | Nuisance particulates | | N95 | This category includes many materials. For oils, an R or P95 filter/respirator is recommended |
| Pentaborane | 19624-22-7 | Pentaboron nonahydride, Stable pentaborane | | SA | Unknown sorbent effectiveness |
| Pentachloronaphthalene | 1321-64-8 | Halowax™ 1013 | Y | OV/N95 | See comment D in Introduction |
| Pentaerythritol | 115-77-5 | Tetramethylolmethane | | N95 | |
| Pentaerythritol triacrylate | 3524-68-3 | 2-Propenoic acid, 2-(hydroxymethyl)-2-[[[(1-oxo-2-propenyloxy)methyl]-1,3-propanediyl]-ester, PETA | | OV/P95 | See comment D in Introduction |
| 1,1,1,2,2-Pentafluoro-ethane | 354-33-6 | Fluorocarbon 125, HFC-125, Pentafluoroethane | | SA | Ineffective sorbents |
| 1,1,1,3,3-Pentafluoro-propane | 460-73-1 | Genetron® 245fa, HFC-245fa, R-245fa | | SA | |
| Pentane, all isomers | 109-66-0 78-78-4 463-82-1 | n-Pentane | | OV | Short service life. 3M Organic Vapor Monitors. |
| 2,4-Pentanedione | 123-54-6 | Acetylacetone, Diacetylmethane | Y | OV | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------------|--|--|-------|------------------|---|
| Pentyl acetate, all isomers | 628-63-7 626-38-0 620-11-1 625-16-1 123-92-2 624-41-9 | 2-Acetoxy pentane, 3-Amyl acetate, n-Amyl acetate, sec-Amyl acetate, tert-Amyl acetate, Banana oil, 1,1-Dimethylpropyl acetate, Isoamyl acetate, Isopentyl acetate, 3-Methyl-1-butanol acetate, 1-Methylbutyl acetate, 2-Methylbutyl acetate, 3-Methylbutyl acetate, 2-Methylbutyl ethanoate, 1-Pentanol acetate, 2-Pentanol acetate, 1-Pentyl acetate, 2-Pentyl acetate, 3-Pentyl acetate | | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Peracetic acid | 79-21-0 | Acetic peroxide, Peroxyacetic acid | | (F)OV/AG/ N95 | See Technical Data Bulletin #185. See comment E in Introduction |
| Perchloroethylene | 127-18-4 | Perk, Tetrachloroethylene | | (F)OV | 3M Organic Vapor Monitors |
| Perchloromethyl mercaptan | 594-42-3 | PMM, Trichloromethyl sulfur chloride | | OV | |
| Perchloryl fluoride | 7616-94-6 | Chlorine oxyfluoride | | SA | Unknown sorbent effectiveness |
| Perfluorobutyl ethylene | 19430-93-4 | 1H,1H,2H-Perfluorohexene; 1-Hexane, 3,3,4,4,5,5,6,6-nonafluoro; PFBE | | OV | Short service life |
| Perfluoroisobutylene | 382-21-8 | Octafluoroisobutylene, Octafluoro-sec-butene; PFIB | | SA | Short OV service life |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------------|-----------|--|-------|------------|--|
| Persulfates, Ammonium | 7727-54-0 | | | N95 | |
| Persulfates, Potassium | 7727-21-1 | | | (F)N95 | |
| Persulfates, Sodium | 7775-27-1 | | | (F)N95 | |
| Petroleum distillates | 8002-05-9 | Aliphatic petroleum naphtha, Petroleum ether (boiling range 95-115 degrees C), Petroleum naphtha | | OV | Odor variable. See also Gasoline, Stoddard solvent. 3M Organic Vapor Monitors. |
| Phenol | 108-95-2 | Carbolic acid, Monohydroxy benzene | Y | OV/N95 | |
| m-Phenylenediamine | 108-45-2 | 1,3-Benzenediamine, m-Diaminobenzene | | OV/N95 | SA preferable if heat involved |
| o-Phenylenediamine | 95-54-5 | 1,2-Benzenediamine, o-Diaminobenzene, Orthamine | | OV/N95 | SA preferable if heat involved |
| p-Phenylenediamine | 106-50-3 | 1,4-Diaminobenzene, p-Diaminobenzene | | OV/N95 | SA preferable if heat involved |
| Phenyl ether, vapor | 101-84-8 | Diphenyl ether, Diphenyl oxide | | OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Phenyl ether-biphenyl mixture vapor | 8004-13-5 | Diphenyl oxide-diphenyl mixture, Dowtherm™ A | | OV | See comment E in Introduction |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|---|-------|------------|--|
| Phenyl glycidyl ether | 122-60-1 | 1,2-Epoxy-3-phenoxy propane, Glycidyl phenyl ether, Oxirane, PGE, Phenoxymethyl, Phenoxypropenoxide, Phenyl epoxypropyl ether | Y | OV | |
| Phenylhydrazine | 100-63-0 | Hydrazinobenzene | Y | (F)OV | |
| Phenyl isocyanate | 103-71-9 | Carbamil, Isocyanatobenzene, Phenyl carbamide | | OV | |
| Phenyl mercaptan | 108-98-5 | Benzenethiol, Thiophenol | | OV | |
| Phenylphosphine | 638-21-1 | | | OV | |
| Phosgene | 75-44-5 | Carbon oxychloride, Carbonyl chloride, Chloroformyl chloride | | SA | |
| Phosphine | 7803-51-2 | Hydrogen phosphide, Phosphorus hydride | | SA | 6007/60927 recommended for certain applications. See technical data bulletin |
| 2-Phosphono-1,2,4-butanetricarboxylic acid | 37971-36-1 | PBTC | | N95 | |
| Phosphoric acid | 7664-38-2 | m-Phosphoric acid, o-Phosphoric acid, White phosphoric acid | | (F)N95 | N95 acceptable with appropriate eye/face protection |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------------|------------|---|-------|------------|--|
| Phosphorus (yellow) | 12185-10-3 | White phosphorus, WP | | SA | If no phosphorus vapor or phosphine gas present, N95 |
| Phosphorus oxychloride | 10025-87-3 | Phosphoryl chloride | | (F)AG | |
| Phosphorus pentachloride | 10026-13-8 | Phosphoric chloride | | AG | |
| Phosphorus pentasulfide | 1314-80-3 | Phosphoric sulfide | | N95 | |
| Phosphorus trichloride | 7719-12-2 | Phosphorus chloride | | (F)AG | |
| o-Phthalaldehyde | 643-79-8 | 1,2-Benzenedialdehyde, OPA | Y | (F)OV/N95 | 3M Formaldehyde Monitors |
| Phthalic anhydride | 85-44-9 | 1,3-Isobenzofurandione, PAN | Y | OV/N95 | See comment D in Introduction |
| m-Phthalodinitrile | 626-17-5 | IPN, Isophthalodinitrile, m-Dicyanobenzene | | OV/N95 | See comment D in Introduction |
| o-Phthalodinitrile | 91-15-6 | 1,2-Benzenedicarbonitrile, 1,2-Benzodinitrile, 1,2-Dicyanobenzene, o-Benzenedinitrile, Phtalic acid dinitrile | | OV/N95 | See comment D in Introduction |
| 2-Picoline | 109-06-8 | 2-Methyl-pyridine, a-Picoline | Y | OV | |
| 3-Picoline | 108-99-6 | 3-Methyl-pyridine, b-Picoline | Y | OV | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------------------|------------|--|-------|------------|-------------------------------|
| 4-Picoline | 108-89-4 | 4-Methyl-pyridine, g-Picoline | Y | OV | |
| Picric acid | 88-89-1 | 2,4,6-Trinitrophenol, Lyddite, Melinite, Pertite, Shimose | | N95 | |
| Piperazine and salts | 110-85-0 | 1,4-Diazacyclohexane, Diethylenediamine, 1,4-Piperazine, Hexahydropyrazine, Piperazidine | | OV/N95 | See comment D in Introduction |
| Piperidine | 110-89-4 | Hexahydropyridine | Y | (F)OV | |
| Platinum metal (as Pt) | 7440-06-4 | | | N95 | |
| Platinum soluble salts (as Pt) | | | | (F)N95 | |
| Polyethylene glycols | 25322-68-3 | PEG, PGE, Polyoxyethylene | | R95 P95 | See comment G in Introduction |
| Polypropylene glycols | 25322-69-4 | PPG | | R95 P95 | See comment G in Introduction |
| Polyvinyl chloride | 9002-86-2 | Cloroethene polymer, Cloroethylene homopolymer, Cloroethylene polymer, Polychloroethylene, PVC, Vinyl chloride homoploymer, Vinyl chloride polymer | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|------------|---|-------|------------|---|
| Portland cement (containing no asbestos and <1% crystalline silica) | 65997-15-1 | Cement, Hydraulic cement, Portland cement silicate | | N95 | |
| Potassium bromate | 7758-01-2 | Bromic acid potassium salt | | N95 | |
| Potassium hydroxide | 1310-58-3 | Caustic potash, Lye, Potassium hydrate | | N95 | |
| Propane | 74-98-6 | Dimethyl methane, n-Propane | | SA | Ineffective sorbents |
| 2-Propanol | 67-63-0 | IPA, Isopropanol, Isopropyl alcohol, sec- Propyl alcohol | | (F)OV | Irritation also provides warning. 3M Organic Vapor Monitors. |
| n-Propanol | 71-23-8 | 1-Propanol, Ethyl carbinol, n-Propyl alcohol, Propan-1-ol | | (F)OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Propargyl alcohol | 107-19-7 | 2-Propyn-1-ol | Y | OV | |
| Propargyl bromide | 106-96-7 | 1-Bromo-2-propyne; 3-Bromopropyne; Bromopropyne; gama-Bromoallylene; Propyne, 3-bromo | Y | OV | |
| 2-Propenoic acid, Isooctyl ester | 29590-42-9 | IOA, Isoctyl acrylate | | OV | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------------|-----------|---|-------|------------|---|
| b-Propiolactone | 57-57-8 | 3-Hydroxy beta-lactone; 3-Hydroxypropionic acid; beta-Propiolactone; BPL; Hydroacrylic acid, beta-lactone; Propiolactone | | (F)OV | OSHA requires SA with hood for certain applications; see 29 CFR 1910.1003 |
| Propionaldehyde | 123-38-6 | 1-Propanal, Methylacetaldehyde, Propylaldehyde | | SA | Short OV service life. 3M Formaldehyde Monitors. |
| Propionic acid | 79-09-4 | Ethylformic acid, Methylacetic acid | | (F)OV | |
| n-Propyl acetate | 109-60-4 | Acetic acid n-propyl ester, Propyl acetate | | (F)OV | 3M Organic Vapor Monitors |
| Propylene | 115-07-1 | 1-Propene, 1-Propylene, Methylethene, Methylethylene, Propene | | SA | |
| Propylene dichloride | 78-87-5 | 1,2-Dichloropropane | | OV | 3M Organic Vapor Monitors |
| Propylene glycol, aerosol only | 57-55-6 | 1,2-Dihydroxy propane, 1,2-Propanediol, Methyl glycol | | R95 P95 | See comment G in Introduction |
| Propylene glycol, vapor and aerosol | 57-55-6 | 1,2-Dihydroxy propane, 1,2-Propanediol, Methyl glycol | | OV/P95 | See comment G in Introduction |
| Propylene glycol dinitrate | 6423-43-4 | 1,2-Propanediol dinitrate, 1,2-Propylene glycol dinitrate | Y | (F)OV | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|-----------|---|-------|------------|--|
| Propylene glycol ethyl ether | 1569-02-4 | Propylene glycol monoethyl ether | Y | (F)OV | |
| Propylene glycol monomethyl ether | 107-98-2 | 1-Methoxy-2-propanol | | OV | 3M Organic Vapor Monitors |
| Propylene glycol monomethyl ether acetate | 108-65-6 | 1-Methoxy-2-acetoxyp propane, 1-Methoxy-2-propanol acetate, 2-Methoxy-1-methylethyl acetate, Glycol ether PM acetate, PGMEA | | OV | 3M Organic Vapor Monitors |
| Propyleneimine | 75-55-8 | 2-Methylaziridine | Y | (F)OV | Short service life |
| Propylene oxide | 75-56-9 | 1,2-Epoxypropane, 1,2-Propylene oxide, 2,3-Epoxypropane, Methyloxirane, Propene oxide | | OV | Short service life. 3M Organic Vapor Monitors. |
| n-Propyl nitrate | 627-13-4 | Nitric acid n-propylester | | OV | |
| Pyridine | 110-86-1 | Azabenzene, Azine | | OV | 3M Organic Vapor Monitors |
| Quinoline | 91-22-5 | 1-Azana-phthalene, 1-Benzazine, Chinoline, Lencol, Leukoline | Y | (F)OV | |
| Quinone | 106-51-4 | Benzoquinone, p-Benzoquinone | | (F)OV/N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|---|--|-------|------------|--|
| Resorcinol | 108-46-3 | 1,3-Benzenediol, m-Dihydroxybenzene | | N95 | OV/N95 may be preferable if heat is involved |
| Rhodium, metal and insoluble compounds (as Rh) | 7440-16-6 | | | N95 | |
| Rhodium, soluble compounds(as Rh) | | | | N95 | |
| Selenium & compounds (as Se) | 7782-49-2 | | | N95 | |
| Selenium hexafluoride | 7783-79-1 | | | SA | Unknown sorbent effectiveness |
| Silica, amorphous (diatomaceous earth) | 61790-53-2 | Diatomite, Silicon dioxide | | N95 | |
| Silica, crystalline | 14808-60-7 1317-95-9 14464-46-1 15468-32-3 | Crystallized silicon dioxide, Cristobalite, a-Quartz, Silica, Tripoli, Tridymite | | N95 | |
| Silicon | 7440-21-3 | | | N95 | |
| Silicon carbide (fibrous) | 409-21-2 | | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|--|-------|------------|--|
| Silicon carbide (nonfibrous particles with no asbestos and <1% crystalline silica) | 409-21-2 | | | N95 | |
| Silicon tetrahydride | 7803-62-5 | Silane | | SA | |
| Silver, metal and soluble compounds (as Ag) | 7440-22-4 | | | N95 | |
| Soapstone (particles with no asbestos and <1% crystalline silica) | | Massive talc, Soapstone silicate, Steatite | | N95 | |
| Sodium azide as hydrazoic acid vapor | 26628-22-8 | Hydrazoic acid vapor | | SA | Unknown sorbent effectiveness |
| Sodium azide as sodium azide | 26628-22-8 | Hydrazoic acid (no vapor) | | N95 | |
| Sodium bisulfite | 7631-90-5 | Sodium hydrogen sulfite | | AG/N95 | N95 alone may be suitable if irritation eliminated |
| Sodium borate, anhydrous | 1330-43-4 | Borates, tetrasodium salts, anhydrous; Borax fused; Boric acid, disodium salt; Disodium tetraborate; Sodium tetraborate, anhydrous | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-----------------------------|------------|---|-------|------------|--|
| Sodium borate, decahydrate | 1303-96-4 | Borascu; Borates, tetrasodium salts, decahydrate; Borax; Borocin; Disodium diborate decahydrate; Disodium tetraborate decahydrate; Sodium pyroborate decahydrate; Sodium tetraborate, decahydrate | | N95 | |
| Sodium borate, pentahydrate | 12179-04-3 | Borates, tetrasodium salts, pentahydrate; Boric acid, pentahydrate; Boron sodium oxide, pentahydrate; Mule team borascu; Sodium tetraborate pentahydrate | | N95 | |
| Sodium chloroacetate | 3926-62-3 | Chloroacetic acid, sodium salt; Monoxone; Sodium monochloroacetate | | N95 | |
| Sodium fluoroacetate | 62-74-8 | 1080, SFA, Sodium monofluoroacetate | Y | N95 | |
| Sodium hydroxide | 1310-73-2 | Caustic soda, Lye, Soda lye | | N95 | |
| Sodium hypochlorite | 7681-52-9 | Hypochlorous acid, sodium salt; Sodium oxychloride | | N95 | Chlorine may also be present |
| Sodium metabisulfite | 7681-57-4 | Sodium pyrosulfite | | AG/N95 | N95 alone may be suitable if irritation eliminated |
| Starch | 9005-25-8 | Corn starch | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--------------------|--|---|-------|------------|--|
| Stearates | 557-05-1; 557-04-0; 57-11-4; 822-16-2 | Aluminium stearate, Calcium stearate, Glyceryl stearate, Lithium stearate, Magnesium stearate, Potassium stearate, Sodium stearate, Stearic acid, Zinc stearate | | N95 | |
| Stibine | 7803-52-3 | Antimony trihydride, Hydrogen antimonide | | SA | Unknown sorbent effectiveness |
| Stoddard solvent | 8052-41-3 | Dry cleaning safety solvent, Mineral spirits | | OV | 3M Organic Vapor Monitors |
| Strontium chromate | 7789-06-2 | C.I. pigment yellow 32, Strontium yellow | | N95 | |
| Strychnine | 57-24-9 | | | N95 | |
| Styrene | 100-42-5 | Cinnamene, Phenylethylene, Styrene monomer, Vinyl benzene | | OV | 3M Organic Vapor Monitors |
| Subtilisins | 1395-21-7 9014-01-1 | Proteolytic enzymes as 100% crystalline enzyme | | SA | Difficult to measure 10X OEL. N95 acceptable with suitable air sampling data |
| Sucrose | 57-50-1 | Saccharose, Table sugar | | N95 | |
| Sulfur dioxide | 7446-09-5 | SO ₂ | | AG | Irritation and taste also provides warning |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|---|-------|------------|---|
| Sulfur hexafluoride | 2551-62-4 | SF6 | | SA | Unknown sorbent effectiveness |
| Sulfuric acid | 7664-93-9 | Hydrogen sulfate, Matting acid, Oil of vitriol, Sulphuric acid, Vitriol brown oil | | (F)N95 | N95 acceptable with appropriate eye/face protection |
| Sulfur monochloride | 10025-67-9 | Sulfur chloride, Sulfur subchloride | | (F)AG | |
| Sulfur pentafluoride | 5714-22-7 | Disulfur decafluoride | | AG | |
| Sulfur tetrafluoride | 7783-60-0 | | | AG | |
| Sulfuryl fluoride | 2699-79-8 | | | SA | Unknown sorbent effectiveness |
| Synthetic vitreous fibers - Continuous filament glass fibers | | Fibrous glass, dust; Glass, fibrous or dust | | N95 | |
| Synthetic vitreous fibers - glass wool fibers | | | | N95 | |
| Synthetic vitreous fibers - refractory ceramic fibers | | | | N95 | |
| Synthetic vitreous fibers - rock wool fibers | | Mineral (rock), wool fiber | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|--|-------|------------|-------------------------------|
| Synthetic vitreous fibers - slag wool fibers | | | | N95 | |
| Synthetic vitreous fibers - special purpose glass fibers | | | | N95 | |
| Talc (no asbestos and <1% crystalline silica) | 14807-96-6 | Hydrous magnesium silicate, Non-asbestiform talc, Non-fibrous talc, Steatite talc | | N95 | |
| Tantalum, metal and oxide dusts (as Ta) | 7440-25-7 | | | N95 | |
| Tellurium and compounds (as Te, excluding hydrogen telluride) | 13494-80-9 | | | N95 | |
| Tellurium hexafluoride (as Te) | 7783-80-4 | | | SA | Unknown sorbent effectiveness |
| Terephthalic acid | 100-21-0 | 1,4 Benzenedicarboxylic acids, Benzene-p-dicarboxylic acid, p-Phthalic acid, Tephthol, TPA | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|--|-------|------------|--|
| Terphenyls | 26140-60-3 | Diphenyl benzenes, Mixed terphenyls, m-Terphenyl, o-Terphenyl, p-Terphenyl | | N95 | OV/N95 may be preferable if heat is involved |
| 1,1,2,2-Tetrabromo-ethane | 79-27-6 | Acetylene tetrabromide, Muthmann's liquid, Tetrabromoethane, Tetrabromoethylene | | OV/N95 | See comment E in Introduction |
| 1,1,1,2-Tetrachloro-2,2-difluoroethane | 76-11-9 | 2,2-Difluoro-1,1,1,2-tetrachloroethane, Freon® 112a, Halocarbon 112a, Refrigerant 112a | | OV | |
| 1,1,2,2-Tetrachloro-1,2-difluoroethane | 76-12-0 | Freon® 112, Halocarbon 112, Refrigerant 112 | | OV | |
| 1,1,2,2-Tetrachloro-ethane | 79-34-5 | Acetylene tetrachloride | Y | OV | |
| Tetrachloronaphthalene | 1335-88-2 | Halowax™, Nibren wax, Seekay wax | | OV/N95 | See comment D in Introduction |
| 2,3,5,6-Tetrachloro-pyridine | 2402-79-1 | Pyridine 2,3,5,6-tetrachloro- | | OV/N95 | See comment D in Introduction |
| Tetrachlorosilane | 10026-04-7 | Silicon chloride, Silicon tetrachloride | | AG/N95 | Reacts rapidly with moisture yielding HCl and silica |
| Tetraethylene glycol diacrylate | 17831-71-9 | 2-Propionic acid, oxy-bis (2,1-ethanedioxy-2,1-ethanediol) ester, TTEGDA | Y | OV/P95 | See comment D in Introduction |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|----------|---|-------|------------|---------------------------|
| Tetraethylene pentamine | 112-57-2 | 1,2-Ethanediamine, N-(2-aminoethyl)-N'-(2-((2-aminoethyl)amino)ethyl), DEH 26, TEPA, Tetraethyl pentamine, Tetren 1,4,7,10,13-Pentaazatridecane | Y | (F)OV | |
| Tetraethyl lead (as Pb) | 78-00-2 | Lead tetraethyl, TEL | Y | OV | |
| 1,1,1,2-Tetrafluoro-ethane | 811-97-2 | Fluorocarbon 134a, HFA 134a, HFC 134a, Tetrafluoroethane | | SA | Ineffective sorbents |
| Tetrafluoroethylene | 116-14-3 | 1,1,2,2-Tetrafluoroethylene, Fluoroplast 4, Perfluoroethene, Perfluoroethylene, Tetrafluoroethene, TFE | | SA | |
| 2,3,3,3-Tetrafluoro-propene | 754-12-1 | | | SA | |
| Tetrahydrofuran | 109-99-9 | Diethylene oxide, Tetramethylene oxide, THF | Y | OV | 3M Organic Vapor Monitors |
| Tetrahydrofurfuryl alcohol | 97-99-4 | Tetrahydro-2-furancarbinol, Tetrahydro-2-furanmethanol, Tetrahydro-2-furylmethanol, THFA | Y | OV | |
| Tetrakis (hydroxymethyl) phosphonium chloride | 124-64-1 | Proban CC, Pyroset TKC, Retardol C, Tetrahydroxymethyl phosphonium chloride, THPC | | N95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|------------|--|-------|------------|-------------------------------|
| Tetrakis (hydroxymethyl) phosphonium sulfate | 55566-30-8 | bis Tetrakis-(hydroxymethyl) phosphonium sulfate, Octakis (hydroxymethyl) phosphonium sulfate, Pyroset TKO, Retardol S, THPS | | N95 | |
| Tetramethyl lead (as Pb) | 75-74-1 | Lead tetramethyl, TML | Y | OV | |
| Tetramethyl succinonitrile | 3333-52-6 | TMSN | Y | OV/N95 | See comment D in Introduction |
| Tetranitromethane | 509-14-8 | Tetan | | OV | |
| Tetryl | 479-45-8 | N-Methyl-N-2,4,6-tetranitroaniline; Nitramine; Tetralite; 2,4,6-Trinitrophenylmethyl nitramine | | N95 | |
| Thallium, elemental and soluble compounds (as Tl) | 7440-28-0 | Thallium acetate, Thallium carbonate, Thallium hydroxide | Y | N95 | |
| 4,4'-Thiobis(6-tert-butyl-m-cresol) | 96-69-5 | 4,4'-Thiobis(3-methyl-6-tert-butylphenol) | | N95 | |
| Thioglycolic acid | 68-11-1 | Mercaptoacetic acid, Thioranic acid | Y | (F)OV | |
| Thionyl chloride | 7719-09-7 | Sulfur oxychloride, Sulfurous oxychloride | | (F)AG | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|-----------------------|---|-------|------------|-------------------------------|
| Thiram (inhalable fraction and vapor) | 137-26-8 | Tetramethylthioram disulfide, TMT, TMTD, TMTDS | | OV/N95 | See comment D in Introduction |
| Tin and inorganic compounds, except SnH ₄ and In ₂ O ₅ Sn (as Sn) | 7440-31-5 | | | N95 | |
| Tin - organic compounds (as Sn) | | | Y | OV/N95 | See comment D in Introduction |
| Titanium dioxide | 13463-67-7 | Anatase, Brookite, Rutile | | N95 | |
| Titanium tetrachloride | 7550-45-0 | Titanium chloride | | AG/N95 | |
| Toluene | 108-88-3 | Aantisal 1a, Methacide, Methyl benzene, Methylbenzol, Monomethyl benzene, Phenyl methane, Tol, Toluol, Tolu-sol | | OV | 3M Organic Vapor Monitors |
| Toluene diamine | 25376-45-8 95-80-7 | Diaminotoluene, TDA, Tolyenediamine | Y | N95 | |
| Toluene-2,4-diisocyanate | 584-84-9 | 2,4-TDI, 2,4-Toluene diisocyanate | Y | OV/N95 | See comment E in Introduction |
| Toluene-2,6-diisocyanate | 91-08-7 | 2,6-TDI, 2,6-Toluene diisocyanate | Y | OV/N95 | See comment E in Introduction |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|----------------------------|----------|--|-------|--------------|---|
| p-Toluenesulfonyl chloride | 98-59-9 | 4-Methyl-benzenesulfonyl chloride, Tosyl chloride | | (F)OV/AG/N95 | See comment D in Introduction. HCl and p-toluene sulfuric acid produced by hydrolysis |
| m-Toluidine | 108-44-1 | m-Aminotoluene | Y | (F)OV | |
| o-Toluidine | 95-53-4 | 1-Methyl-1,2-aminobenzene, 2-Methylaniline, o-Aminotoluene, o-Methylaniline | Y | (F)OV | |
| p-Toluidine | 106-49-0 | p-Aminotoluene | Y | (F)OV | |
| Tributyl phosphate | 126-73-8 | TBP, Tri-n-butyl phosphate | | OV/P95 | See comment E in Introduction |
| Trichloroacetic acid | 76-03-9 | TCA | | (F)OV/AG | Irritation also provides warning |
| 1,2,4-Trichlorobenzene | 120-82-1 | | | OV | |
| 1,1,2-Trichloroethane | 79-00-5 | b-Trichloroethane, Vinyl trichloride | Y | (F)OV | 3M Organic Vapor Monitors |
| Trichloroethylene | 79-01-6 | 1,1,2-TCE, 1-Chloro-2,2-dichloroethylene, Ethylene trichloride, TCE, Triclene™ | | OV | 3M Organic Vapor Monitors |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|------------|---|-------|------------|--|
| Trichlorofluorome- thane | 75-69-4 | CFC-11, Fluorotrichloromethane, Freon™ 11, Refrigerant 11, Trichloromonofluoromethane | | SA | Short OV service life |
| Trichloronaphthalene | 1321-65-9 | Halowax™, Nibren wax, Seekay wax | Y | OV/N95 | See comment D in Introduction |
| 1,2,3-Trichloropro- pane | 96-18-4 | Allyl trichloride, Glycerin trichlorohydrin, Glycerol trichlorohydrin, Trichlorohydrin | Y | (F)OV | |
| Trichlorosilane | 10025-78-2 | Silicochloroform | | (F)AG | |
| 1,1,2-Trichloro-1,2,2- trifluoroethane | 76-13-1 | FC-113, Freon® 113, Halocarbon 113, Refrigerant 113, TTE | | SA | Short OV service life. 3M Organic Vapor Monitors. |
| Triethanolamine | 102-71-6 | 2,2,2-Nitritotriethanol, Daltogen, Sterolamide, TEA, Trihydroxytriethylamine | | OV/P95 | See comment D in Introduction |
| Triethoxysilane | 998-30-1 | Silane, triethoxy- | | (F)SA | Unknown sorbent effectiveness |
| Triethylamine | 121-44-8 | N,N-Diethylethanamine, N-Triethylamine, TEA | | (F)OV | AM not specifically approved, but 3M recommended for longer service life |
| Triethylene glycol diacrylate | 1680-21-3 | 2-Propenoic acid, 2-ethanediylbis-(oxy- 2,1-ethanediyl) ester; TREGDA | Y | OV/P95 | |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------------------------|-----------|---|-------|------------|---|
| Triethylenetetramine | 112-24-3 | 1,4,7,10-Tetraazadecane, 1,8-Diamino-3,6-diazaoctane, 3,6-Diazaoctane-1,8-diamine, N, N'-bis(2-aminoethyl)-1,2,ethane diamine, TECZA, TETA, Trientine | Y | OV | See comment E in Introduction. R or P filter, if filter required |
| Triethylphosphate | 78-40-0 | Phosphoric acid triethyl ester | | OV/P95 | |
| Trifluorobromomethane | 75-63-8 | Bromotrifluoromethane, Freon® 13B1, Halocarbon 13B1, Halon™ 1301, Refrigerant 13B1 | | SA | Short OV service life |
| 1,1,1-Trifluoro-2,2-dichloroethane | 306-83-2 | FC-123, HCFC-123, Hydrofluorocarbon 123 | | SA | Short OV service life |
| 1,1,1-Trifluoroethane | 420-46-2 | FC-143a, HFC-143a, Hydrofluorocarbon 143a | | SA | Ineffective sorbents |
| 2,2,2-Trifluoroethanol | 75-89-8 | 2,2,2-Trifluoroethyl alcohol; Ethanol, 2,2,2,-Trifluoro; TFE | | SA | Ineffective sorbents |
| 1,3,5-Triglycidyl-s-triazinetrione | 2451-62-9 | 1,3,5-Triazine-2,4,6-(1H,3H,5H)-trione, Araldite PT-810, TEPIC | | N95 | |
| Trimellitic anhydride | 552-30-7 | Anhydrotrimellitic acid, TMA, TMAN, Trimellitic acid anhydride | | OV/N95 | Chemical manufacturer's recommendation. See comment D in Introduction |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|------------------------------------|------------|--|-------|------------|--|
| Trimethoxysilane | 2487-90-3 | | | (F)OV | |
| Trimethylamine | 75-50-3 | N,N-Dimethylmethanamine, N-Trimethylamine, TMA | | (F)AM | AM not specifically approved, but 3M recommended for longer service life |
| Trimethyl benzene | 25551-13-7 | Hemimellitene, Mesitylene, Pseudocumene | | OV | |
| Trimethylchlorosilane | 75-77-4 | Chlorotrimethylsilane, Monochlorotrimethylsilicon, Trimethyl chlorosilane | | (F)OV/AG | |
| Trimethyl phosphite | 121-45-9 | Methyl phosphite, Phosphorus acid trimethylester | | (F)OV | |
| Trimethylolpropane triacrylate | 15625-89-5 | 2-Propenoic acid, 2-ethyl-2(((1-oxo-2-propenyl) oxy) methyl)-1,3-propanediyl ester | Y | OV/P95 | |
| Trimethylolpropane trimethacrylate | 3290-92-4 | Acrylic acid, triester w/2-ethyl 2 (hydroxymethyl) 1,3 propanediol | Y | OV/P95 | |
| 2,4,6-Trinitrotoluene | 118-96-7 | sym-Trinitrotoluene, TNT, Trinitrotoluene, Trinitrotoluol | Y | OV/N95 | See comment D in Introduction |

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| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---|-----------|--|-------|------------|---|
| Triorthocresyl phosphate | 78-30-8 | o-Tritolyl phosphate, TCP, TOCP, Tricresylphosphate | Y | R95 P95 | See comment D in Introduction |
| Triphenyl phosphate | 115-86-6 | Phenyl phosphate, TPP | | N95 | OV/N95 may be preferable if heat is involved |
| Trisodium phosphate | 7601-54-9 | Sodium o-phosphate, TSP | | (F)N95 | N95 acceptable with appropriate eye/face protection |
| Tungsten and compounds, the absence of cobalt | 7440-33-7 | | | N95 | |
| Turpentine | 8006-64-2 | Gum spirits, Gum turpentine, Turps, Wood turpentine | | (F)OV | See comment E in Introduction |
| Uranium, insoluble compounds (as U) | 7440-61-1 | | | N95 | See 10 CFR 20 subpart H |
| Uranium, soluble compounds (as U) | 7440-61-1 | | | N95 | AG/N95 if halides. See 10 CFR 20 subpart H |
| Urea | 57-13-6 | Carbamide, Carbonyldiamide, Carbonyldiamine, Isourea | | N95 | AM/N95 may be preferable if heat is involved |
| n-Valeraldehyde | 110-62-3 | Pentanal, Valeric aldehyde | | (F)OV | 3M Formaldehyde Monitors |
| Vanadium pentoxide | 1314-62-1 | Vanadic anhydride, Vanadium oxide | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|---------------------------|-----------|--|-------|------------|---|
| Vanadium pentoxide fume | 1314-62-1 | | | N95 | |
| Vanillin | 121-33-5 | Vanilla, Vanillaldehyde, Vanillic aldehyde | | N95 | |
| Vegetable oil | | | | R95 P95 | |
| Vinyl acetate | 108-05-4 | 1-Acetoxyethylene, Ethenyl acetate | | (F)OV | 3M Organic Vapor Monitors |
| Vinyl bromide | 593-60-2 | Bromoethylene | | (F)SA | Short OV service life |
| Vinyl chloride | 75-01-4 | Chloroethene, Chloroethylene, Monochloroethylene, VC, VCM, Vinyl chloride monomer | | SA | OSHA allows OV for very short use periods. See 29 CFR 1910.1017. 3M Organic Vapor Monitors. |
| 4-Vinylcyclohexene | 100-40-3 | 1-Vinylcyclohexene-3, 4-Ethenyl-1-1-cyclohexene, 4-Vinyl-1-cyclohexene, 4-Vinylcyclohex-1-ene, 4-Vinylcyclohexene-1-butadiene dimer, VCH | | OV | 3M Organic Vapor Monitors |
| Vinyl cyclohexene dioxide | 106-87-6 | Vinylcyclohexane dioxide | Y | (F)OV | |
| Vinyl fluoride | 75-02-5 | Fluoroethene, Fluoroethylene, Monofluoroethylene | | SA | Short OV service life |

NOTE: See important warnings, definitions, and explanation of column headings and abbreviations starting on page 1. For occupational exposure limits, please see your local regulatory authority. In the US, please see <https://www.osha.gov/annotated-pels>.

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|--|------------|--|-------|------------|---|
| Vinylidene chloride | 75-35-4 | 1,1-Dichloroethylene, VDC | | OV | Short service life. 3M Organic Vapor Monitors. |
| Vinylidene fluoride | 75-38-7 | 1,1-Difluoroethene; 1,1-Difluoroethylene; Ethene,1,1-difluoro; Ethylene,1,1-difluoro; Halocarbon 1132A; VDF; Vinylidene difluoride | | SA | Ineffective sorbents |
| N-Vinyl-2-pyrrolidone | 88-12-0 | 1-Ethenyl-2-pyrrolidinone, 1-Vinylpyrrolidinone, N-Vinylpyrrolidinone, Vinylbutyrlactam, Vinylpyrrolidinone, Vinylpyrrolidone | | OV | 3M Organic Vapor Monitors |
| Vinyl toluene | 25013-15-4 | Methyl styrene, Tolyethylene | | (F)OV | See comment E in Introduction. 3M Organic Vapor Monitors. |
| Vinyltrichlorosilane | 75-94-5 | Silane trichloroethenyl, Silane trichlorovinyl, Trichlorovinyl silicane, Trichlorovinylsilane, Trichlorovinylsilicon, Vinylsilicon trichloride | | OV/AG | |
| Wood dust (All varieties except western red cedar) | | | | N95 | |
| Wood dust (Western red cedar) | | | | N95 | |

| Contaminant | CAS # | Synonym | Skin? | Respirator | Comments |
|-------------------------------------|--|--|-------|------------|-------------------------------|
| Xylene (o-, m-, p-isomers) | 1330-20-7 95-47-6 108-38-3 106-42-3 | Dimethylbenzene (o-, m-, p-isomers), 1,2-Dimethylbenzene, 1,3-Dimethylbenzene, 1,4-Dimethylbenzene | | OV | 3M Organic Vapor Monitors |
| m-Xylene a,a'-diamine | 1477-55-0 | MXDA | Y | OV/N95 | See comment D in Introduction |
| Xylidine | 1300-73-8 | Aminodimethyl benzene, Aminoxylene dimethyl aniline, Dimethylaminobenzene | Y | OV/N95 | See comment E in Introduction |
| Yttrium, metal and compounds (as Y) | 7440-65-5 | | | N95 | |
| Zinc chloride fume | 7646-85-7 | Zinc chloride fume | | N95 | |
| Zinc chromate | 13530-65-9 11103-86-9 37300-23-5 | Basic zinc chromate, Chromates of zinc, Zinc potassium chromate, Zinc yellow | | N95 | |
| Zinc oxide | 1314-13-2 | Zinc white, Zincite, | | N95 | |
| Zirconium and compounds (as Zr) | 7440-67-7 | | | N95 | |

Respirator Codes and Descriptions

| | |
|------|--|
| (F) | Full Facepiece (with appropriate cartridges and filters) |
| AG | Acid Gas Respirator |
| AM | Ammonia/Methylamine Respirator |
| FORM | Formaldehyde Respirator |
| HF | Hydrogen Fluoride Respirator |
| Hg | Mercury Vapor Respirator |
| MG | Multi-gas/Vapor Respirator |
| N100 | N100 Particulate Respirator |
| N95 | N95 Particulate Respirator |
| OV | Organic Vapor Respirator |
| OZ | Ozone Respirator |

| | |
|-------|--|
| P100 | P100 Particulate Respirator |
| P95 | P95 Particulate Respirator |
| R95 | R95 Particulate Respirator |
| SA | Supplied Air Respirator |
| SA(F) | Supplied air respirator with full facepiece, helmet, hood or loose fitting facepiece |

Note: Respirator abbreviations may be combined. For example, (F)OV/AG/P95 is a full facepiece respirator with an organic vapor/acid gas cartridge and a P95 particulate filter.

3M also offers 3M™ Select Software and 3M™ Service Life Software. Select Software helps you select the most appropriate respirator. Service Life Software estimates service life of 3M gas/vapor cartridges. Both programs are simple, accurate and give printable reports. [3M.com/sls](https://www.3m.com/sls)

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