**Xylene**

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### Properties
- Organic aromatic hydrocarbon
- Colorless, sweet-smelling and highly flammable liquid
- Exists in 3 isomeric forms

![Three isomeric forms of xylene](http://encyclopedia2.thefreedictionary.com/Xylene)

### Occupational Exposure

#### Routes of Exposure
- Inhalation
- Dermal
- Ingestion

#### Gas chromatography (GC)
- Samples
- 100 ppm

#### Acute
- Health of Pathology Laboratory Technicians at Risk from Common Solvents like Xylene and Toluene.
- OSHA Permissible Exposure Limit (PEL): 8-hour Time Weighted Average (TWA) - 100 ppm
- NIOSH Recommended Exposure Limit (REL): 10-hour TWA - 100 ppm
- STEL: 150 ppm
- Threshold Limit Value (TLV): 8-hour TWA - 100 ppm
- ACGIH Threshold Limit Value (TLV): 8-hour TWA - 100 ppm
- STEL: 150 ppm

### Occupational Exposure Limits (OELs)

#### Sampling Methods
- OSHA Method 1002
  - Sampling media: charcoal tubes
  - Samples are collected with a personal sampling pump calibrated, with the sampler attached, to within ±5% at 50 mL/min.
  - Sampling media: diffusive samplers
  - Samples are collected with SKC 575-002 passive samplers.

![Activated charcoal tubes and diffusive samplers](http://www.skince.com)

### Analytical Methods
- Gas chromatography (GC) equipped with a flame ionization detector (FID)

### Highlighted Worker Exposure
- Biomedical laboratory technicians who work with toluene and xylene double their chances of developing Raynaud’s phenomenon.
- Those who also worked with acetone or chlorinated solvents were 9 times more likely to develop Raynaud’s phenomenon.
- Exposure to xylene is through handling wet sample slides without gloves.

![Raynaud's phenomenon](http://www.atsdr.cdc.gov/toxprofiles/tp71.pdf)

### Control Measures
- Engineering controls: substitution, enclosure, local exhaust ventilation, non-sparking ventilation systems
- Administrative controls: Worker rotation to limit the exposure time
- Personal protective equipment (PPE): eye/face protection, gloves, boots, aprons, and a NIOSH-approved air-purifying respirator with an organic vapor cartridge (up to 900 ppm)

### Toxicological Data
- Routes of Exposure: inhalation, dermal, ingestion
- Health Effects:
  - Acute health effects: severe abdominal pains, nausea, vomiting, possible loss of consciousness
  - Chronic – laryngitis, bronchitis, bronchial pneumonia
  - Known to be a non-carcinogen
  - Animals studies showed high exposure can cause harmful effects in the liver, kidneys, lungs, heart and nervous system

![Raynaud's phenomenon](http://www.atsdr.cdc.gov/toxprofiles/tp71.pdf)

### References
- Occupational Safety and Health Administration (OSHA). Xylene sampling method. [https://www.osha.gov/dts/chemicalsampling/data/CH_276400.html](https://www.osha.gov/dts/chemicalsampling/data/CH_276400.html)
- Xylene Poisoning in Laboratory Workers: Case Reports and Discussion. [https://labmed.oxfordjournals.org/content/11/9/993.abstract](https://labmed.oxfordjournals.org/content/11/9/993.abstract)
- Occupational Safety and Health Administration (OSHA). Safety and Health Topics: Laboratory. [https://www.osha.gov/SLTC/etools/hospital/lab/lab.html#Toluene_Xylene_or_AcrylamideExposure](https://www.osha.gov/SLTC/etools/hospital/lab/lab.html#Toluene_Xylene_or_AcrylamideExposure)