Acrylamide

Standard Operating Procedure

Revision Date: 11/10/23

Laboratory Director (LD) Approval is Required Prior to Performing this Procedure

This standard operating procedure (SOP) outlines the handling and use of Acrylamide. Review this document and supply the information required in order to make it specific to your laboratory. In accordance with this document, laboratories should use appropriate controls, personal protective equipment, and disposal techniques when handling Acrylamide. All laboratory workers must read and understand the [Laboratory Emergencies SOP](https://ehs.umich.edu/wp-content/uploads/2022/05/LaboratoryEmergencyProceduresSOP.docx) prior to commencing any work in a laboratory.

# Description [Provide additional information as it pertains to your research protocol]

Acrylamide (CAS# 79-06-1) is a reactive monomer used as a reagent in polymers or co-polymers and is used to make polyacrylamide. Polyacrylamide polymers are used in adhesives, sizing agents, soil conditioning agents, flocculants, waste treatments, chemical grouting, and the production of N-methylolacrylamide. Acrylamide must be used in a well-ventilated area.

## Process [Write the steps for using phenol in your research protocol]

# Potential Hazards [Provide additional information as it pertains to your research protocol]

* Acrylamide is considered a Particularly Hazardous Substance (PHS) because it is a probable human carcinogen – Group B2. The International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), and the Department of Health and Human Services have concluded that acrylamide is reasonably anticipated to be a human carcinogen. (PubChem Compound Summary for CID 6579, Acrylamide, 2023)
* Possible routes of exposure include inhalation, skin contact, eye contact, and ingestion. Acrylamide is highly toxic by inhalation and skin contact. It can easily penetrate intact skin.
* Acrylamide is known to affect the nervous system with early signs of exposure including numbness, tingling, and tenderness to touch. Symptoms can be delayed several days to weeks and if exposure continues, even in small quantities, other symptoms may arise including excessive sweating, blue-reddish skin, peeling of skin, and weakness in limbs.
* Animal studies have shown some maternal and paternal reproductive health effects from exposure to acrylamide.
* Acrylamide may cause sensitization by inhalation or contact with skin.
* Acrylamide may polymerize explosively if heated to 183°F (85°C).
* Consult the SDS and [Laboratory Chemical Safety Summary: Acrylamide](https://www.nap.edu/read/4911/chapter/14#250) (Prudent Practices in the Laboratory: Handling and Disposal of Chemicals, 1995).

# Occupational Exposure Limits (OELs):

* MIOSHA: **0.03 mg/m3, 8-hour** PEL
* ACGIH: **0.03 mg/m3, 8-hour** TLV
* NIOSH: **0.03 mg/m3, 10-hour** REL

Contact EHS for assistance in performing an exposure assessment.

# Engineering Controls [Provide additional information as it pertains to your research protocol]

If aerosols may be produced (e.g., weighing powder), acrylamide and any suspensions of acrylamide must be handled in a chemical fumehood, exhausted biological safety cabinet with negative pressure ductwork, or other exhausted enclosure. Aerosols may be produced during any open handling of dry powder and during open or pressurized manipulations of suspensions. It is recommended that labs post a sign explaining the aerosol procedures.

# Work Practice Controls [Provide additional information as it pertains to your research protocol]

* Set up a designated area for storage and work with acrylamide.
* When possible, order pre-cast polyacrylamide gels to avoid work with acrylamide powder. Acrylamide can also be ordered already in solution.
* Avoid contact with incompatibles including metals, oxidizing agents, reducing agents, acids, bases, and peroxides.
* Use bench pads to cover areas that may become contaminated with acrylamide powder or suspensions for easy clean-up.
* Wipe down the surfaces where acrylamide is used periodically with a detergent and water solution.
* If weighing dry acrylamide powder, and the balance cannot be located in a fumehood or BSC, tare a container then add the material to the container in a hood and seal the container before returning to the balance to weigh the powder.
* Change gloves regularly (at least every two hours) and wash hands at the time of the glove change.
* Keep containers closed as much as possible.

# Personal Protective Equipment [Provide additional information as it pertains to your research protocol]

* Standard nitrile laboratory gloves and a fully buttoned lab coat with sleeves extending to the wrists must be worn when handling acrylamide. When handling suspensions or solutions, choose a glove that is protective against the solvent. If gloves are splashed or come in contact with acrylamide, change them as soon as possible.
* If splashes may occur, wear goggles. Otherwise, wear standard laboratory safety glasses.
* In cases where the arms or torso may be exposed to liquid suspensions or dry particles, wear Tyvek sleeves and/or gowns (or other air-tight, non-woven textile).

# Transportation and Storage [Provide additional information as it pertains to your research protocol]

* Acrylamide must be in sealed, shatter-resistant containers during transportation. If the container is not shatter-resistant, use a secondary container.
* Store away from heat and flame.
* Store acrylamide away from any incompatible materials including metals, oxidizing agents, reducing agents, acids, bases, and peroxides.

# Waste Disposal [Provide additional information as it pertains to your research protocol]

Acrylamide is considered a hazardous waste and must be properly disposed of. **Do not dispose of chemical wastes by dumping them down a sink, flushing in a toilet, or discarding in regular trash containers, unless authorized by Environment, Health & Safety (EHS) Hazardous Materials Management (HMM)**. Contact EHS-HMM at (734) 763-4568 for waste containers, labels, manifests, waste collection, and for any questions regarding proper waste disposal. Also, refer to the EHS [Hazardous Waste](http://ehs.umich.edu/haz-waste/) Web page for more information.

# Training of Personnel

All personnel shall read and fully adhere to this SOP when handling acrylamide.

# References

Prudent Practices in the Laboratory: Handling and Disposal of Chemicals. (1995). Washington, DC: The National Academies Press. doi:10.17226/4911

*PubChem Compound Summary for CID 6579, Acrylamide*. (2023). Retrieved from National Center for Biotechnology Information: https://pubchem.ncbi.nlm.nih.gov/compound/6579

# Certification

I have read and understand the above SOP. I have received approval from my Lab Director to perform this procedure. I agree to contact my Lab Director if I plan to modify this procedure.

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### Major Revisions (Tracking purposes only -- Do not print as part of SOP)

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| Date | Revision |
| 09-13-18 | EHS name and logo were added, updated the formatting, and revised the content under Exposure/Unintended Content (AKJ). |
| 03-01-19 | Reviewed and updated |
| 05-15-20 | Updated editing rights to headings (RSH) |
| 04-06-22 | Reviewed and updated hyperlinks. Updated surface decontamination procedures. (LGS) |
| 05-11-22 | Removed emergency response procedures section (LGS) |
| 11-10-23 | Added references (RSH) |

**References**

Acrylamide. (n.d.). Chemwatch – Leaders in Chemical Management, SDS Management, SDS Authoring and Chemical Regulations. <https://bulletin.chemwatch.net/uncategorized/acrylamide>

NTP (National Toxicology Program). 2021. Report on Carcinogens, Fifteenth Edition; Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. <https://ntp.niehs.nih.gov/go/roc15>

Urben, P.G. (Ed.). (2017) *Bretherick’s Handbook of Reactive Chemicals 8th ed.* Elsevier