# 2YC Answers to Questions and Additional Resources

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## Gloves Questions and Resources

1. Glove Resources:
   1. Contact manufacturer for product sheet that should have information regarding types of chemicals it can be used with the breakthrough time.
   2. Reference other guides
      1. [Shield Scientific](https://www.shieldscientific.com/chemical-resistant-disposable-gloves-guide/?crg_action=search&ordre=undefined&idCAS=none&idChem=361&idBrand_1=none&idBrand_2=none&idBrand_3=none) can filter by breakthrough time and chemical type.
      2. [Ansell Guardian](https://www.ansell.com/us/en/ansellguardian-chemical) can filter by type of gloves and chemical type
      3. [Cal Berkley](https://ehs.berkeley.edu/glove-selection-guide#GCC) has a general chart that has information regarding overall glove types and chemical resistance but does not include any specific information like breakthrough time or brands.
2. Is double gloving for organic solvent use recommended?
   1. Double gloving of single-use nitrile gloves is fine with short-term contact and small amount of use with organic solvents. It is not recommended for long-term contact and larger amounts. Utilize sturdier or more chemical resistant gloves (butyl, neoprene, PVC, PVA) over nitrile gloves to provide additional protection. More flexible and chemical resistant gloves are available now and usually come with modified grip (one example of a [neoprene glove](https://www.ansell.com/us/en/products/alphatec-53-001) that could be used with hydrocarbons and acids). These gloves are reuseable – up until there is breakthrough (usually damage or regular wear and tear).
3. What gloves does other Universities use for organic laboratories?
   1. Our laboratories typically use single use nitrile (unless they’re working with something that is not compatible with these gloves) since they are typically not handling things for a long period of time and are told to frequently change gloves if they do get anything on them.
4. In order to reuse gloves, what should be advised to students and faculty members?
   1. We do not recommend re-using single-use nitrile gloves. Reuseable gloves like the stronger butyl, PVC, PVA, or neoprene gloves are recommended to reuse and can be wiped down after their use. Single-use nitrile gloves have a shorter breakthrough time and spray / wiping down with things like ethanol or acetone also breaks down the gloves so it does not offer great protection when re-used (hence, single-use).

## Green Chemistry Questions and Resources

1. Green Chemistry Resources
   1. [Solvent Tool](https://acsgcipr.org/tools/solvent-tool/) can be used to identify solvent alternatives
   2. [ACS Institute Course – Greening Undergraduate Laboratories: a step-by-step guide to success](file:///C:\Users\dhenry\Downloads\1.%09https:\institute.acs.org\greening-undergraduate-laboratories-a-step-by-step-guide-to-success.html)
2. Is Toluene best substitute to benzene?
   1. Benzene is a known carcinogen and has been linked to leukemia and other blood disorders. Chronic exposure can cause bone marrow suppression, immune system effects, and reproductive toxicity. Acute exposure can lead to dizziness, headaches, confusion, and even unconsciousness at high concentrations. Toluene is less toxic but still hazardous. It primarily affects the central nervous system, causing symptoms like dizziness, headaches, and cognitive impairment. Chronic exposure can lead to neurological damage, but it is not classified as a carcinogen like benzene. Because of benzene’s severe health risks, its use is much more restricted compared to toluene.

## Maximum Allowable Quantities and Control Areas Questions and Resources

1. Fire control areas are an issue we've been looking into tackling now that we have a better idea of the solvents present in lab spaces. How would you recommend we start having these conversations with the labs and the fire department? And what are solutions for areas that exceed those areas (eg. organic labs on higher floors of a building)?
   1. Answer from Alex Hagen at UW: We share overage reports with the lab and their department chair. Sometimes the space a lab has been given doesn't meet their chemical quantity needs. We talk to labs about not stocking up on chemical quantities to reduce the amounts of certain chemicals in a space. We also encourage them to coordinate with neighbors who share the control area in case they can share chemicals to reduce the amounts present in the spaces.
   2. To start having conversations, maybe hosting a seminar about what are MAQs and talking about why these values are important to be below and what it could mean when they are over. Involving the fire department is always great and it helps researchers realize that they could not only be harming themselves / property but could risk others lives (also most fire departments won’t go into lab buildings at all once they’re on fire).
      1. It would be best to start by identifying the MAQs for each area and then work towards seeing if a control area and the labs within those control areas are over. Providing a central resource like [UCI MAQ Resources](https://www.ehs.uci.edu/maq/index.php) could help.
      2. Like Alex stated above, going to then the department chair with the amounts and having a plan to work towards being below that with a timeline and goal would help. Asking the researchers how they could move towards using less etc and making sure to involve PIs and researchers in the solutions will make avoid a lot of issues and barriers.
      3. Feel free to reach out about some tips and activities that I like to use to help break the understanding about why MAQs are important: [amandac8@unc.edu](mailto:amandac8@unc.edu)

## Dichloromethane / Methylene Chloride EPA Ruling Questions and Resources

1. Resources
   1. [EPA Toxic Substances Control Act](https://www.epa.gov/chemicals-under-tsca)
   2. [Memorandum of Understanding Between EPA and OSHA for Implementation of TSCA](https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/memorandum-understanding-between-epa-and-osha)
   3. [OSHA 1910.1052 Methylene Chloride](https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1052)
   4. [EPA Risk Management for Methylene Chloride](https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-methylene-chloride)
      1. [EPA Compliance Guide for Methylene Chloride](https://www.epa.gov/system/files/documents/2024-07/mecl-compliance-guide.pdf)
      2. [EPA Fact Sheet for Final Ruling for Methylene Chloride](https://www.epa.gov/system/files/documents/2024-07/mecl-fact-sheet_0.pdf)
      3. [Methylene Chloride: Regulation Under Section 6(a) of the Toxic Substances Control Act](https://www.govinfo.gov/content/pkg/FR-2024-05-08/pdf/2024-09606.pdf)
   5. [CSHEMA Resources for Methylene Chloride](https://www.cshema.org/index.php/resources/dcm-resources)
   6. [LSI Resources for Methylene Chloride](https://www.labsafety.org/methylene-chloride-webinar-series)
   7. For solvent recommendations, see above for [Green Chemistry Tool.](#_Green_Chemistry_Questions)
   8. Contact information:
      1. [jasmas.snyder@gmail.com](mailto:jasmas.snyder@gmail.com) (Jessica Synder)
2. What are the requirements / timeline for universities?
   1. Use is allowed to continue to for laboratory / research purposes at a University. This does not include facilities uses of paint strippers or any commercial products.
      1. Complete initial monitoring of existing facilities by May 5, 2025
      2. Evaluate exposure limits and dermal protection of existing facilities by August 1, 2025
      3. Develop Workplace Chemical Protection Program and Exposure Control Plans by October 30, 2025
      4. Prohibition on Industrial and Commercial Use - April 28,2026
3. What methods are being used and/or are practical for initial monitoring of DCM exposure for small scale research?
   1. You can identify a local industrial hygienist or group to complete monitoring, especially if you are not familiar with exposure monitoring or have experience completing this.
   2. Passive personal exposure monitoring (e.g., passive air badges) can be used in place of pump / active monitoring. This option may be less expensive.
4. What specific badges is UNC-CH using?
   1. We are using the [Assay Technology 566 Organic Vapor Monitor](https://www.assaytech.com/product/566-organic-vapor-monitor/) or [Assay Technology 525 TraceAir II Organic Vapor Monitor](https://www.assaytech.com/product/566-organic-vapor-monitor/). Calculated out to fit the regulation, the 566 is within the range at 31% of the EPA TSCA 8-hour Action Limit, the 525 is more sensitive at 4.5%. This was confirmed by our analytical lab that we use ([Eurofin Analytics](https://www.eurofinsus.com/environment-testing/built-environment/locations/eurofins-analytics/)). “Sampling methods must be accurate to a confidence level of 95% and within either of the following ranges relative to the EPA exposure limits as noted in § 751.109(d)(2)(iii): ─ Within (plus or minus) 25% of airborne concentrations of methylene chloride above the ECEL or EPA STEL. ─ Within (plus or minus) 35% for airborne concentrations of methylene chloride at or above the ECEL action level but at or below the 8-hour TWA ECEL. [[ Page 19 of Compliance Guide]]”
   2. Use the badge that fits your needs and price range best – ensure that you talk to the technicians that it fits within your needs. Similarly, ensure you are talking with your accredited analytical laboratory.
5. Similar exposure groups or SEGs: a group of workers who have similar exposure risks. SEGs can be used to assess and manage exposure to chemicals and other hazards by grouping workers based on tasks and work practices or exposure measurements.
6. What are the potential exemptions that may be able to forgo initial monitoring?
   1. [[Page 16 of Compliance Guide]] Owners and operators may forgo initial monitoring requirements for a period of 5 years, provided that either of the following conditions are met (see also § 751.109(d)(2)(i) and (ii)):
      1. 1. If the owner or operator provides objective data generated during the last 5 years demonstrating that methylene chloride is not released in the workplace in airborne concentrations at or above the ECEL action level and EPA STEL. The data must represent the highest methylene chloride exposures likely to occur under applicable conditions of use (see also § 751.109(d)(2)(i)). Subsequent initial monitoring must occur within 5 years of the oldest sampling date or date of creation of other objective data in the dataset (see § 751.109(d)(2)(i)), or
      2. 2. If potentially exposed persons are exposed to methylene chloride for fewer than 30 days per year, the owner or operator must provide measurements taken by direct-metering devices that give immediate results and provide sufficient information regarding potentially exposed persons’ exposures to determine and implement the control measures that are necessary to reduce exposures to below the ECEL action level and EPA STEL (see § 751.109(d)(2)(ii)).
7. Do badges count as direct readings in the case of exemptions or would you still need to hire a IH to complete the initial monitoring v. Sending out badges to a vendor for assessment?
   1. Badges are not direct reading – these collect samples over time for time-weighted averages.
   2. Direct read instruments take measurements in real time – by the regulation these have to give immediate results and provide sufficient information regarding the potentially exposed persons’ exposures to determine and implement control. To comply, these would need to read back a value (cannot be qualitative direct read instruments). You can rent these instruments like portable FID or PIDs but they’re expensive and you will need a way to calibrate these before each use.
8. Is there a standardized way to prove that an exemption is met or applicable?
   1. UNC-CH is using the first exemption and has taken “objective data” to mean for each SEG that we’ve determined. Meaning there is enough data and sample size and variability that we have captured the majority of potential exposures for that group and can apply it to another lab within an SEG that performs the process similar to the original group that was monitored. We review each process that the laboratory does and ensure that it fits within the monitored data we’ve gathered. If it does not fit, then we need to do additional monitoring.
   2. For the second exemption, you will still need to monitor using the direct read instruments. A usage log can help support the less than 30 day requirement.
9. based on the TSCA ruling, what's the penalty for being found not-compliant?
   1. EPA TSCA penalties start at $48,512. And they are additive
10. Would you recommend beginning the monitoring before adding that to our CHP?
    1. It depends on what you currently have in your CHP – our monitoring helped inform some of the items we’ve included in our WCPP and has also helped us review and adjust our CHP for areas we were lacking (UNC-CH)

## Chemical Hygiene Plan Questions and Resources

1. Resources
   1. [OSHA Fact Sheet CHP](https://www.osha.gov/sites/default/files/publications/OSHAfactsheet-laboratory-safety-chemical-hygiene-plan.pdf)
   2. [LSI offer resources on CHP](https://www.labsafety.org/product/model-chemical-hygiene-plan-university)
   3. [Committee on Chemical Safety within ACS has a resource folder](https://www.acs.org/about/governance/committees/chemical-safety/publications-resources/curated-resources.html) than can be used to help answer pieces of CHP
   4. Lara O’Connor ([lara.oconnor@aims.edu](mailto:lara.oconnor@aims.edu)), Sierra Thomas ([thomass3@lincolnu.edu](mailto:thomass3@lincolnu.edu)), Dwayne Henry ([dwayne.henry@montgomerycollege.edu](mailto:dwayne.henry@montgomerycollege.edu)), Amanda Chung ([amandac8@unc.edu](mailto:amandac8@unc.edu)) offered support to connect on resources regarding starting a CHP
2. Where is a good starting point to get the CHP, WCPP etc. started? Any contractors that do this?
   1. Lab Safety Institute (LSI) can also potentially help and may be contracted out.
   2. (Marcy Marino) Sierra, you can check my uni's website.
      1. https://www.uaa.alaska.edu/about/administrative-services/departments/environmental-health-and-safety/\_documents/chem-hygiene-plan.pdf for the CHP, and https://www.uaa.alaska.edu/about/administrative-services/departments/environmental-health-and-safety/\_documents/chem-hygiene-plan.pdf for all of our publically available documents.
   * Prudent Practices: <https://www.ncbi.nlm.nih.gov/books/NBK55878/>
     1. Or <https://nap.nationalacademies.org/catalog/12654/prudent-practices-in-the-laboratory-handling-and-management-of-chemical>
3. We have very little DCM - but more important, we don't have any of the required plans for any chemicals other than sort of an inventory.
   1. A chemical hygiene plan is definitely a good place to start as the other documentation can be added to it / included as you make it. Getting an accurate inventory is the first step to identify exactly what you need to include.