

ADMINISTRATIVE GUIDELINE – TURKEYFOOT VALLEY AREA SCHOOL DISTRICT

Chemical Management

705.3 AR

Administrative Guideline

Chemical management encompasses chemical procurement, storage, distribution, and use. Chemical management is a district-wide effort, and not just the responsibility of the science teachers.

1 General Strategies

- Purchase the least hazardous chemical that will do the job. “Green” and low volatile organic compound (VOC) cleaners and paints are preferable from both a hazardous material management and an indoor air quality (IAQ) standpoint.
- Do not accept samples or donated chemicals or products unless they are needed for a specific purpose or project.
- Maintain an MSDS for each chemical or product used or present in the school. These documents need to be readily accessible to both personnel who use the products and to emergency responders. A copy of all MSDSs should be kept in the chemical coordinator’s office. An MSDS for each chemical in a given storage area should be kept near, but not inside, that storage area.
- Under the Pennsylvania Worker and Community Right to Know Act of 1984, all staff who work with or have a potential for exposure to hazardous chemicals must be provided annual training and information on the locations, proper use, hazards, protective equipment, and proper disposal required for each.
- <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=553055&mode=2>
- Try to minimize the total quantity of each hazardous material in storage to just what will be actually needed before the next order.
- Minimize the number of chemical storage locations. Each department should have a storage location that is accessible only by them.
- When a chemical or product is received, mark the date on the package or case. When an individual container is opened, mark this date on it, along with the expiration date, for products that have a limited shelf life after opening.
- Perform an annual inventory and inspection, looking for signs of leaking or bulging containers, damaged labels, deteriorated chemicals and containers, and products past their expiration date. Immediately replace damaged labels, and remove expired products.
- Prepare a written spill response plan that covers each type of chemical or product used or stored at the school. It should cover responding to both large and small quantity spills, in the locations where they are likely to be spilled (such as mercury spill in the

laboratory, gasoline spill in the maintenance shed, or drain opener spill in the restroom). It should also include notification and waste disposal requirements for the spills, and recommended personal protective equipment.

- Obtain chemical spill kits for each storage area. Each kit should contain supplies that are appropriate to the chemicals stored in the area.

2 Standards for Chemical Storage Rooms

Chemical storage areas should provide a safe, secure, and compatible home to your chemicals and products until they are used. The storage area should be able to protect the product from damage, and also protect the building and personnel from the chemical hazard.

Chemicals and products should not be stored directly on the floor. Place larger containers, such as drums, on spill-control pallets.

Class ABC fire extinguishers should be kept near locations where chemicals are stored or used. Employees should receive annual training in their operation and limitations. If flammable metals are present, a Class D fire extinguisher should also be present.

3 Chemical Storage Systems

A variety of different chemicals with different hazards may be present in different departments in a given school. Improper storage of these chemicals may lead to an increased risk of reaction in the event of container failure or spillage. Proper storage of chemicals will help to reduce this risk.

- Chemicals should be stored at an appropriate temperature and humidity level. Do not store chemicals in direct sunlight or near a heat source. Do not store chemicals in locations where they may get wet, it could degrade the container or label, and the chemical might be water-reactive.
- The storage room should have an adequate ventilation system that is separate from the general ventilation system. Ventilation systems on storage rooms with flammable products should be able to maintain the atmosphere at less than 25% of the lower flammable limit.
- Volatile chemicals should be stored in well-ventilated areas that are exhausted to the outside of the building to maintain indoor air quality.
- An inventory of the chemicals present should be maintained in each room where chemicals are stored. MSDSs for the chemicals should be kept nearby.
- Hazardous material storage cabinets should be anchored to the wall. Storage shelves should have a lip at the edge to reduce the risk of chemicals accidentally sliding off. Storage shelves should be strong enough to support their anticipated load.
- Doors on storage cabinets should be closed and latched (and locked when not in use).

- Do not store chemicals randomly or in alphabetical order. This increases the risk of incompatible chemicals coming into contact, especially in the event of a fire or other emergency event.
- Do not store chemicals in a laboratory hood, on bench tops or under sinks. They interfere with the airflow in the hood, are more easily knocked over and could potentially spill into a drain.
- Do not store flammable chemicals in a regular refrigerator. This could result in an explosion and fire. If flammables must be refrigerated, store them in a designated explosion-proof or flammable material refrigerator. Do not store food in a designated chemical refrigerator.
- Do not overcrowd the chemical storage area, which would require you to handle several different containers to get the one you want.

4 Laboratory Chemical Segregation

- Flammable and volatile chemicals should always be stored tightly capped to keep their vapors from interacting and to reduce the potential for human exposure. Always store flammable materials in a flammable storage cabinet, well away from oxidizers.
- Do not store combustible materials inside or on top of flammable material storage cabinets.
- Store corrosive materials in corrosion-resistant containers and cabinets. Store acids and bases separately. Store oxidizing acids, such as nitric acid and perchloric acid separate from other acids.
- Liquids, corrosive chemicals, and glass containers should not be stored on shelves above eye level. It is preferred that no chemicals be stored above eye level.
- Store heavier containers at a level that is consistent with its size and anticipated use. For example, five-gallon buckets with handles could be stored on a pallet on the floor, while smaller heavy products should be stored on a shelf at waist height to minimize bending and twisting while lifting, which could lead to back or shoulder strain.
- Secondary containers or totes should be used to minimize the flow of material in the event of a spill or container leak. The materials should be segregated by hazard category.
- For labs with restricted storage spaces, compatible storage can be provided by grouping chemicals with similar hazards together. These labs could use a simplified system like the one illustrated below.

5 Safe Chemical Handling

- Ensure that all personnel who will be handling chemicals have received the necessary training to do so safely, have reviewed the MSDS, and are using appropriate personal protective equipment. Beyond that, the following guidelines will help you to use all chemicals safely.
- Never eat, drink, smoke or chew gum or tobacco while using hazardous chemicals. Always wash your hands after using chemicals, and before eating, drinking, smoking, chewing gum, or applying cosmetics.
- Never smell or taste a chemical to identify it - make sure all containers are properly labeled with the chemical's identity and hazards.
- Keep containers of flammable and volatile materials closed when not in use to prevent the risk of fire and inhalation exposure. Other containers should also be closed when not in use to prevent a spill if it is accidentally knocked over.
- Keep your work area organized. Always return chemicals to their proper storage location after use, or before leaving work for the day.
- Check the expiration date and condition of chemicals before you use them. Remove any that have expired or that show signs of deterioration.

6 Compressed Gas Cylinders

The safe handling of compressed gas cylinders is critically important because compressed gas cylinders present two hazards. The hazards include: the potentially toxic, corrosive, or flammable chemical hazard associated with the gas itself and the physical hazard of the high pressure gas cylinder. An example of an extreme hazard may occur would be if the cylinder valve gets sheared off in an accidental fall, the cylinder literally would become a rocket that can smash through a cinder block wall.

- Purchase cylinders from companies that will accept the cylinder back. Even non-hazardous compressed gas cylinders can be costly to dispose. Purchase only the size and quantity of cylinders that you need.
- Most high school laboratories are not adequately equipped to safely handle toxic gas cylinders. If considering the use of a toxic gas cylinder for a demonstration, seriously evaluate whether you really need and can safely store and use the product.
- Do not rely on color coding to identify the contents of a compressed gas cylinder. There is no universal standard. Different manufacturers use different color codes. Always check the label. Do not use cylinders with missing or illegible labels.
- When the cylinder is not in use, the valve protection cap must be in place to protect the valve. Never drag, slide or roll the cylinder – get a cylinder cart or truck and use it. The cylinder must be secured to the cart during transport. Never transport the cylinder with the regulator in place – have the valve protection cap on.
- Cylinders must be secured at all times to a wall, lab bench, cylinder storage rack, or welding cart. Use an appropriate material to secure the cylinder: chain, wire rope, straps, etc. The support should contact the cylinder at a point approximately 2/3 of its height.

- Don't store gas cylinders in public hallways or other unprotected areas. Gas cylinder storage should also be segregated by hazard class. Flammable gas should be stored either at least 20 feet from oxygen and oxidizers, or separated by a one-hour fire-rated wall.
- When a cylinder is empty, mark "Empty" or "MT" on the cylinder or tag, or tear off the last strip if it has a perforated status tag. Empty cylinders must still be segregated and properly supported.
- Check the cylinder for damage before use. Make sure the cylinder has the correct regulator. Do not use grease or oil on the regulator or cylinder valve, especially with oxygen – an explosion may result.
- Only open the cylinder valve with a regulator in place. Open the valve all the way – do not leave the valve part way open. When the cylinder is not in use, close the valve, even if it is empty – air and moisture may enter through the open valve, causing contamination and corrosion.
- Tanks of acetylene should only be used in the upright, valve on top position. The acetylene gas is dissolved in liquid acetone inside the tank. Do not use copper or bronze fittings or tubing on acetylene tanks as this may cause an explosion. All oxygen/acetylene setups must have a flashback arrestor check valve at the regulators.
- Do not heat a cylinder to raise the pressure of the gas. The cylinder has a temperature-sensitive safety device to prevent overpressure, and heating the cylinder could cause it to activate, releasing the gas. Similarly, do not allow the cylinder to be near sparks or open flames, or to come into contact with electric wires.

See the NIOSH School Chemistry Laboratory Safety Guide for further compressed gas cylinder safety suggestions.

<http://www.cdc.gov/niosh/docs/2007-107/cylinders.html>