Incompatible Chemicals Storage

A sanitary survey quick reference guide for determining how to properly store chemicals at a water treatment plant

Dos and Don'ts

Do not store liquid chemicals and dry chemicals together regardless of which compatibility group they fall into.

Do not store chemicals from different **compatibility groups** together. Water treatment chemicals are divided into six incompatible groups: Acids, Bases, Salts & Polymers, Adsorption Powders, Oxidizing Powders, and Compressed Gasses. **To ensure the safety of system personnel and the system itself, store each of these groups of incompatible chemicals separately (compatibility groups listed on reverse side).**

Do not store products such as paint, antifreeze, detergent, oil, grease, fuel, solvent, and beverages in the same area as water treatment chemicals.

DO store all chemicals in secure, well-ventilated areas that are free of moisture (especially dry chemicals), excessive heat, ignition sources and flammable/ combustible materials.

DO see your Material Safety Data Sheet (MSDS) if you encounter a chemical that is not listed on one of the following tables (MSDS required by OSHA Regulation 29.CFR.1910.1200 for all organizations/water systems that handle hazardous chemicals).

Warning

Storing incompatible chemicals together could create a hazardous reaction such as the production of toxic gas, accelerated corrosion, or an exothermic reaction (a chemical reaction that releases heat), which could result in an explosion and/or fire. This reaction could be catastrophic, resulting in loss of life and rendering the water plant inoperable.

Examples:

Examples of Incompatible Chemicals	Hazardous Reactions
Powdered Activated Carbon (PAC), an adsorption powder, should not be mixed with Potassium Permanganate, an oxidizing powder	Excessive heat generation, with the possibility of explosion and fire. Note: PAC alone is extremely combustible.
Calcium Hypochlorite, a combination base/oxidizer should not be exposed to moisture or mixed with viscous fluid such as oil.	Excessive heat, fire or explosion possible. Can provide an ignition source for combustible materials.
Concentrated Sulfuric Acid, a strong acid, should not be mixed with Concentrated Sodium Hydroxide, a strong base.	Excessive heat and liquid explosion. Note: Highly concentrated acids and bases when mixed together will have a much more hazardous reaction than weak acids and bases.
Calcium Oxide, a strong base available only as a powder, should not be exposed to moisture	Excessive heat, fire. Can provide an ignition source for combustible materials.

Compatibility Groups: Common Water Treatment Chemicals

Group I: Acids

Name	Common Name	Available Forms
Acetic Acid	Ethanoic Acid	Liquid
Hydrofluosilicic Acid	Fluosilic Acid	Liquid
Hydrogen Fluoride Acid	Hydrofluoric Acid	Liquid
Hydrochloric Acid	Muriatic Acid	Liquid
Nitric Acid	Sulfuric Acid	Liquid

Group II: Bases

Name	Common Name	Available Forms[1]
Calcium Hydroxide	Hydrated Lime	Dry
Calcium Oxide	Quicklime	Dry
Calcium Hypochlorite	HTH	Dry
Sodium Bicarbonate	Sodium Bicarbonate	Dry
Sodium Carbonate	Soda Ash	Dry
Sodium Hydroxide	Caustic Soda, Lye	Liquid, Dry
Sodium Hypochlorite	Bleach	Liquid
Sodium Silicate	Water Glass	Liquid

[1] Certain concentrated dry chemicals, like calcium hypochlorite and calcium oxide (quicklime) will produce an exothermic reaction when exposed to liquid or even small amounts of moisture.

Group III: Salts & Polymers

Name	Common Name	Available Forms
Aluminum Sulfate	Alum	Liquid, Dry
Copper Sulfate	Blue Stone	Liquid, Dry
Ferric Chloride	Ferrichlor	Liquid, Dry
Ferric Sulfate	Ferri-Floc	Dry
Ferrous Sulfate	Copperas	Liquid Dry
Polyaluminum Chloride	PACL	Liquid
Polyelectrolytes (Cationic, Anionic, Non-ionic)	Polymer	Liquid, Dry
Sodium Aluminate	Soda Alum	Liquid, Dry
Sodium Fluoride	Sodium Fluoride	Liquid, Dry
Sodium Hexametaphosphate	Glassy Phosphate	Dry
Sodium Phosphate	Sodium Phosphate	Liquid, Dry
Zinc Orthophosphate	Zinc Ortho	Liquid

Group IV: Adsorption Powders

Name	Common Name	Available Forms
Powdered Activated Carbon	PAC	Dry
Granular Activated Carbon	GAC	Dry

Group V: Oxidizing Powders

Name	Common Name	Available Forms
Potassium Permanganate	Permanganate	Dry

Group VI: Compressed Gases[2]

Name	Common Name	Available Forms	Incompatible Chemicals Within This Category[3]
Ammonia	Ammonia	Liquid, Gas	Chlorine
Chlorine	Gas Chlorine	Liquid, Gas	Ammonia
Carbon Dioxide	Dry Ice	Liquid, Gas	-
Sulfur Dioxide	SO_2	Liquid, Gas	-

[2] Each compressed gas should have its own separate storage/feed area.

[3] Chlorine and ammonia should be stored separately from each other, as well as from all other chemical groups.