Mixed storage of chemicals

MilliporeSigma

Hazardous products must be stored in such a way that:

- risks involved in storing incompatible products together are minimized.
- dangerous, violent reactions, such as the generation of flammable gases or very toxic gases are prevented.
- in the event of fire, toxic smoke is avoided.

For safety reasons, all products to be stored must be classified in the storage class relevant to their specific hazard characteristics. A chemical can only be classified in one storage class. Chemicals having more than one hazardous property are assigned to a class based on a ranking system for the hazard involved. This guarantees that chemicals with the same or similar hazardous properties can be treated similarly with regard to the necessary safety measures, in particular fire and explosion protection. All MilliporeSigma reagents and chemicals are assigned to the storage class stated in their respective Safety Data Sheets (SDS).

When the recommendations for mixed storage of chemicals of StoreCard are used, national regulations for separate and segregated storage must also be adhered to.

The mixed storage table indicates whether a product in a particular storage class may be stored together with one in another class, whether such mixed storage together is prohibited (separate storage required) or whether there are restrictions on mixed storage that have to be observed (segregated storage in the same storage area required).

Separate storage:

The term “separate storage” means locating products in different storage areas. A storage area is a section of a warehouse is separated from other rooms by either by fire-resistant walls and ceilings or safety cabinets or both. Separate storage may be necessary to avoid the increased risk which may happen if contact occurs between products of different storage classes.

Segregated storage:

The term “segregated storage” means storage in the same storage area where the products are separated from one another by gaps or barriers (e.g. walls, non-combustible substances of storage class 10-13) or in safety cabinets made of non-combustible material.

The mixed storage of products of differing storage classes is only permitted if certain conditions are met (e.g. identical extinguishing agent for all products, identical temperature conditions).

Segregated storage within one area may also be necessary if certain products are in the same storage class, but have special properties. This is also the case for products in differing storage classes, with particular properties, for which mixed storage in accordance with the mixed storage table is normally permitted (Example: cyanides must not be stored together with substances, such as acids, with which they can form hydrogen cyanide.). Information on this is available in the hazard and precautionary statements (e.g. H225, H302, H332, P210, P240, P403 + P233). However, chapter 10 (stability and reactivity) of the SDS is of no use.

Storage class		GHS-pictogram*	Hazard labels*	10-13	13	12	11	10	8 B	8 A	7	6.2	6.1 D	6.1 C	6.1 B	6.1 A	5.2	5.1 C	5.1 B	5.1 A	4.3	4.2	4.1 B	4.1 A	3	2 B	2 A	1
Explosive substances	1																										1
Gases	2 A			2			2			2								1								2	3
Aerosols	2 B																	1									
Flammable liquids	3			5			5						6						4								
Flammable solids (explosive)	4.1 A			1	1	1	1	1	1	1							1						1	1			
Flammable solids and desensitized substances	4.1 B												6			4	1		4		6	6					
Substances liable to spontaneous combustion	4.2			6			6	6	6	6			6	6							6						
Substances that form flammable gases in contact with water	4.3			6		6	6	6	6	6			6	6													
Oxidizing substances (strong oxidizer)	5.1 A																										
Oxidizing substances	5.1 B			7			4	4		4			4	4	4	4	1	1									
Oxidizing substances (ammonium nitrate)	5.1 C			6	6	6	6	6	1	1																	
Organic peroxides and self-reactive substances	5.2			1			1	1																			
Combustible acute toxic substances	6.1 A			5			5																				
Non-combustible acute toxic substances	6.1 B			5			5																				
Combustible toxic substances or substances wit chronic effect	6.1 C																										
Non-combustible toxic substances or substances wit chronic effect	6.1 D																										
Infectious substances	6.2																										
Radioactive substances	7										1																
Combustible corrosive substances	8 A																										
Non-combustible corrosive substances	8 B																										
Other combustible liquids	10																										
Other combustible solids	11																										
Other non-combustible liquids	12																										
Other non-combustible solids	13																										
Other combustible and non-combustible substances	10-13																										

* Only if relevant for allocation for storage class ■ Mixed storage is permitted in principle
■ Mixed storage is permitted only with restrictions (see number) ■ Separate storage is required

1. A risk assessment is necessary. Are there no significant risks a mixed storage is permitted.

2. Combustible substances, with the exception of flammable liquids, may be stored in storage areas in which there are no more than 50 full compressed-gas cylinders – of which a maximum of 25 of them contain flammable, oxidizing or toxic gases – provided the storage area for compressed-gas cylinders is separated by an at least two-metre high wall made of non-combustible building materials. Alternatively, there must be at least five-metres distance between the gas cylinders and the combustible substances.

3. Up to 150 compressed-gas containers containing flammable, oxidising and inert gases may be stored together. In addition 15 compressed-gas containers with toxic and highly toxic gases may be stored together with them at the same time.

4. Mixed storage is permitted if the following restrictions and quantities of all goods are adhered to:

maximum quantity (tonnes)

restrictions		3	4.1 B	5.1 B	6.1 A	6.1 B
1	– no restrictions	1	10[1)]	1	1	1
2	– only with a functioning automatic fire-alarm system	—	20	—	—	—
3	– only with a functioning automatic extinguisher system	20	100[1)]	20	20	20

1) These quantities apply only to the mixed storage of store class 4.1 B with store class 6.1 A.

5. Products that ignite easily or cause a fire to spread rapidly, such as packaging materials, must not be stored together with toxic substances or flammable liquids.

6. Products which do not react with one another in the event of an incident may be stored together. This can be achieved by segregated storage, e.g. physical separation, large gaps between containers, separate containment basins, or storage in safety cabinets.

7. Mixed storage with non-combustible substances is permitted. For mixed storage with combustible substances see point 4.

Protective measures and rules of conduct

The potential harm that may arise in the storage of chemicals depends not only on the quantities involved, but also on the particular hazards they pose. Uncontrolled storage is not permitted. The following requirements apply to all hazardous chemicals.

1. Safety instructions, which relate either to individual chemicals or to classes of chemicals with the same hazardous properties, need to be compiled.
2. Chemicals must be stored strictly according to the warehousing plan.
3. Workers must wear suitable protective clothing (overalls, safety shoes and as needed, also safety goggles and protective gloves) within the warehouse.
4. There must be a strict ban on naked flames, unshielded lights and smoking.
5. Stored goods must be handled in a way that prevents damage to packaging and the escape of chemicals.
6. Escape routes, emergency exits and access routes for the emergency services must be kept free at all times.
7. Suitable fire extinguishers (ABC powder extinguishers), first-aid boxes and eyewash bottles must be close at hand.
8. Written permission must be obtained before any welding is undertaken. The same applies to the use of power tools (for drilling, grinding, etc).
9. There must be a strict ban on smoking, eating and drinking in areas where chemicals are stored.

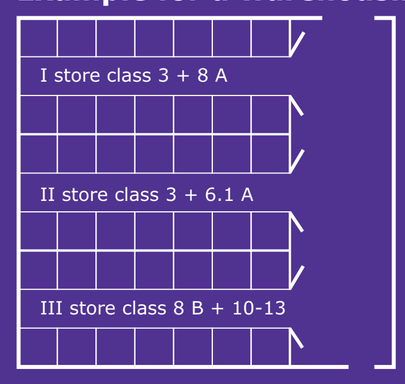
Special rules for the storage of small quantities

These regulations apply to storage rooms with a capacity of less than one tonne or to safety cabinets. The storage table for small quantities shows, by means of GHS-pictograms, combinations of products may be stored together (+) or not (-). There are no exceptions for explosive substances, gases, organic peroxides, self-reactive substances and radioactive substances; the mixed storage table (see above) still applies.

											none
	+	+	-	-	-	+	+	+	+	+	+
	+	+	+	+	-	+	+	+	+	+	+
	-	+	+	+	-	-	+	+	+	+	+
	-	+	+	+	-	-	-	-	-	-	-
	-	-	-	-	+	+	+	+	+	+	+
	+	+	-	-	+	+	-	+	+	+	+
	+	+	+	-	+	-	+	+	+	+	+
	+	+	+	-	+	+	+	+	+	+	+
	+	+	+	-	+	+	+	+	+	+	+
	+	+	+	-	+	+	+	+	+	+	+
none	+	+	+	-	+	+	+	+	+	+	+

■ Flammable liquids and aerosols
■ Substances liable to spontaneous combustion
■ Substances that form flammable gases in contact with water
■ Flammable solids

Example for a warehousing plan



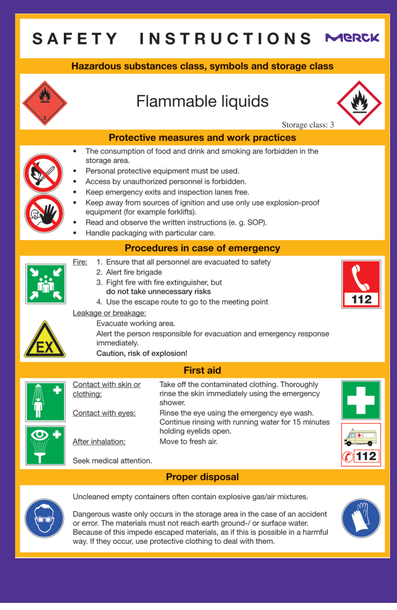
Warehousing plan

total storage quantity: **50 t**

maximum storage quantity of store class 3 in Room I and II: **15.000 l**

store class 8 A in Room I
Only in unbreakable packaging

Example for a safety instruction


SAFETY INSTRUCTIONS Merck

Hazardous substances class, symbols and storage class

Flammable liquids

Storage class: 3

Protective measures and work practices

- The consumption of food and drink and smoking are forbidden in the storage area.
- Personal protective equipment must be used.
- Access by unauthorized personnel is forbidden.
- Keep emergency exits and inspection lanes free.
- Keep away from sources of ignition and use only use explosion-proof equipment (for example forklifts).
- Read and observe the written instructions (e. g. SOP).
- Handle packaging with particular care.

Procedures in case of emergency

Fire:
1. Ensure that all personnel are evacuated to safety
2. Alert fire brigade
3. Fight fire with fire extinguisher, but do not take unnecessary risks
4. Use the escape route to go to the meeting point

Leakage or breakage:
Evacuate working area.
Alert the person responsible for evacuation and emergency response immediately.
Caution, risk of explosion!

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First aid

Contact with skin or clothing: Take off the contaminated clothing. Thoroughly rinse the skin immediately using the emergency shower.

Contact with eyes: Rinse the eye using the emergency eye wash. Continue rinsing with running water for 15 minutes holding eyelids open.

After inhalation: Move to fresh air.

Seek medical attention.

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Proper disposal

Uncleaned empty containers often contain explosive gas/air mixtures.

Dangerous waste only occurs in the storage area in the case of an accident or error. The materials must not reach earth ground-/ or surface water. Because of this impede escaped materials, as if this is possible in a harmful way. If they occur, use protective clothing to deal with them.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the U.S. and Canada.

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