

# Checklist

## Storage of Hazardous Materials

*Innovative Approaches for the Sound  
Management of Chemicals and Chemical Waste*



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

Below you will find a list of questions related to the prevention of hazards as illustrated in the presentation “Storage of Hazardous Materials”. If a question does not apply to your company, go to the next question.

- If you have answered “☒ No” or “☒ Partially” to one of the questions, additional measures should be taken and recorded on page 10.

## General storage rules

1	<p>Are hazardous materials always stored in their original containers?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
2	<p>Are hazardous materials clearly identified (SDSs, labels, signs indicating where hazardous substances are stored)? (Figure 1 and Figure 2)</p> <p><i>Example: Inventory and safety data sheets (SDSs) should be available:</i></p> <ul style="list-style-type: none"> <li>- Maximum quantities and currently stored quantities of hazardous materials</li> <li>- Storage position on a map</li> <li>- File containing the SDS for every substance</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
3	<p>Are hazardous materials stored in a way that storage incompatibilities are excluded?</p> <p><i>Example: Flammable materials should not be stored with corrosive substances. Acids and bases must not be stored together.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
4	<p>Are storage rooms naturally or artificially ventilated? (Figure 3)</p> <p><i>Attention: Ammoniac and gaseous chlorine require specific storage conditions designed by a specialist.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
5	<p>Have catch basins been installed for each hazardous liquid to confine leakages? (Figure 4, Figure 5 and Figure 6)</p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

If they have to be poured into another container, the new receptacle must have the same mechanical, chemical and physical properties and must be properly labelled.



Figure 1: Safety data sheets stored with the substance  
Source: CSD

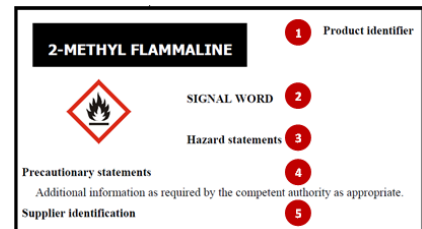


Figure 2: Label  
Source: United Nations

Ventilation:

- Extraction near the ceiling if the gas is lighter than the air
- Extraction near the floor if the gas is denser than the air
- Air replacement three to five times per hour

<p><b>6</b></p>	<p>Is the flooring of the storage area impermeable?</p> <p><i>Example: Special incombustible coating</i></p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>7</b></p>	<p>Are storage areas clearly identified according to storage categories (e.g. flammable, toxic, corrosive, etc.)?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>8</b></p>	<p>Are other non-hazardous materials stored in separate premises?</p> <p><i>Example: wrapping, paper, cardboard, spare parts, etc.</i></p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>9</b></p>	<p>Are containers protected from any thermal and mechanical influences?</p> <p><i>Example: heat sources, object falls, pressure, etc.</i></p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>10</b></p>	<p>Has a person responsible for the storage areas been appointed?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>11</b></p>	<p>Is personal protective equipment easily available and properly maintained?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>12</b></p>	<p>Are hazardous substances stored in minimal quantities?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>13</b></p>	<p>Has at least one eye shower been installed?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>14</b></p>	<p>Has stock control been implemented?</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>- <i>First-in/first-out</i></li> <li>- <i>Move redundant stock</i></li> </ul>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>
<p><b>15</b></p>	<p>Are “empties” segregated (cylinders, sacks, drums, bottles)?</p>	<p><input type="checkbox"/> Yes  <input type="checkbox"/> Partially  <input type="checkbox"/> No</p>

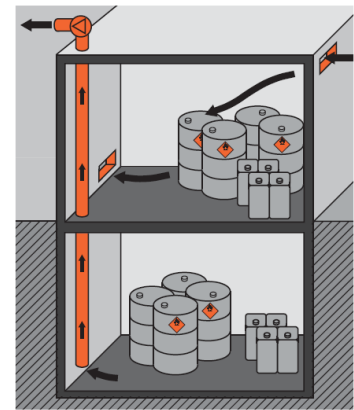


Figure 3: Artificial ventilation

Source: Suva



Figure 4: Container storage

Source: UNIDO

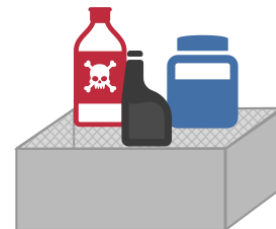


Figure 5: Post-storage

Source: CSD

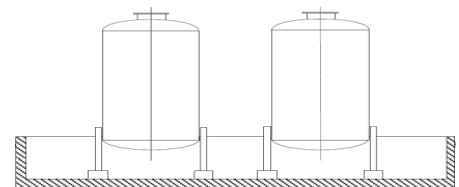


Figure 6: Bulk storage

Source: ECA

16	Is an adequate access for both normal and emergency purposes ensured including alternative routes?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
17	Is the stock monitored?  <i>Example: temperature, pressure, degradation of substances, deterioration of packaging or containers, corrosion, leakages, condition of labels, expiry date, etc.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
18	Has appropriate gas/vapour/fume/pressure venting been provided, (e.g. flame arrestors, scrubbers, absorbers, stacks)?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
19	Is the lighting safe and adequate?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
20	Are stack heights limited?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

**Specific storage rules: Liquefied gases or gases under pressure**

21	Are gas bottles protected by a fence? (Figure 7)	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
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Figure 7: Fence protecting gas bottles  
Source: Suva

**Specific storage rules: Flammable liquids**

22	Have measures been taken to avoid the presence of ignition sources in the vicinity of flammable liquids?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
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23	Are electrical devices in storage areas grounded and used so as to avoid ignition?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
24	Are empty containers carefully cleaned to avoid the presence of explosive air/gas mixes?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
25	Is smoking forbidden and have appropriate prohibitive signs been displayed?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
26	Are containers always closed to avoid evaporation?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
27	Are maximum storage quantities observed (depending on the danger class of the flammable substance)?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
28	<p>Are structural requirements met, given the stored quantities and danger classes of the stored substances?</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>- Flammable liquids of categories F1 or F2 (quantity inferior to 100 litres) can be stored together, in a specific room built in a material with a fire-resistance period of 30 minutes and fire compartments.</li> <li>- For quantities superior to 1,000 litres, each substance must be isolated in a specific fire compartment.</li> <li>- For quantities superior to 2,000 litres, the installation of a lightning rod is required.</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
29	Are storage compartments divided into storage subareas separated by at least three metres? (Figure 8)	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
30	Are storage compartments separated by at least ten metres or by a firewall? (Figure 9 and Figure 10)	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

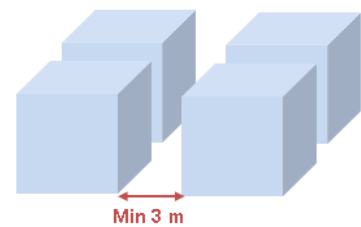


Figure 8: Storage subareas separated by 3 m  
Source: Based on ECA

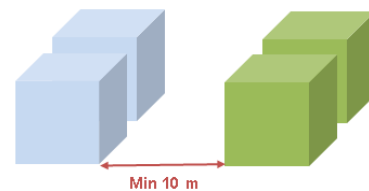


Figure 9: Storage compartments separated by 10 m  
Source: Based on ECA

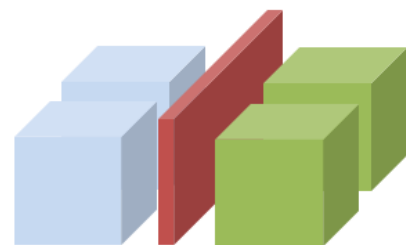


Figure 10: Storage compartments separated by a fire wall  
Source: Based on ECA

## Outdoor storage

31	Has each drum been labelled?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
32	Are the stack heights limited (e.g. 4.5 metres for 200-litre drums)?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
33	Are the highly flammable liquids segregated, marked and classified as Explosive Zone 2?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
34	Are stacks of combustible materials separated from buildings (7.5 m) and plant boundary fences (4 m)?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
35	Is the number of 180-litre drums restricted to 1,500?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
36	Is there a 5 m clearance between adjacent stacks with access on three sides for firefighters?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
37	Is the access limited to authorized persons?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
38	Are safety distances for storage in tanks or containers observed?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

See presentation “Storage of Hazardous Materials” for more details.

### Specific storage rules: Flammable solids

39	Are dust deposits avoided and regularly cleaned?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
40	Are storage areas for flammable solids isolated from any ignition source?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

41	Are flammable solids in quantities greater than 1,000 kg stored in fire compartments?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
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### Specific storage rules: Pyrophoric (auto-flammable) substances

42	Are auto-flammable substances stored inside only?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
43	Are auto-flammable substances protected from any heat source?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
44	<b>Auto flammable substances should never be stored with combustible, explosive or flammable substances.</b> Has this requirement been met?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
45	Are auto-flammable substances in quantities greater than 1,000 kg stored in fire compartments?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

The ambient temperature should be controlled.

### Specific storage rules: Water reactive substances

46	Are these substances stored in a dry place in hermetically closed containers?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
47	<b>Substances that produce flammable gases when reacting with water should not be stored with halogens (i.e. fluorine, chlorine, bromine).</b> Has this requirement been met?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
48	For quantities over 100 kg: Is the substance isolated in a fire compartment?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
49	Are specific extinguishers available? Is the sign "Do not extinguish with water" visible?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

## Specific storage rules: Oxidizing substances/organic peroxides

<p><b>These substances must not be stored with combustible (even non-hazardous substances, wood or paper) or caustic substances. Has this requirement been met?</b></p>		<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
51	If stored in the same room with other substances, are they stored in specific metal boxes or cupboards?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
52	Are organic peroxides requiring refrigeration stored accordingly?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
53	For quantities over 100 kg: Is the substance isolated in a fire compartment?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

## Specific storage rules: Toxic substances

54	<p>Are the storage areas for toxic substances only accessible to authorized persons?</p> <p><i>Example:</i></p> <ul style="list-style-type: none"> <li>- Key</li> <li>- Code</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
55	For quantities over 1,000 kg: Is the substance isolated in a fire compartment?	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

## Specific storage rules: Corrosive and caustic substances

56	<p><b>These substances must not be stored with substances that create toxic gases with acids or with combustible and oxidizing substances. Has this requirement been met?</b></p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
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57	<p>Are containers and catch basins resistant to corrosion?</p> <p><i>Example: special plastics or resin</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
58	<p>Are acids and bases physically separated and stored in separate catch basins?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
59	<p>For quantities over 1,000 kg: Is the substance isolated in fire compartments?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No

### Storage of hazardous waste

60	<p>The same rules as previously presented apply to the storage of hazardous waste. Have these recommendations been followed and has compliance been ensured?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> Partially <input type="checkbox"/> No
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Checklist filled in by: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Measures planned:  
**Storage of hazardous materials**

Checked premises: \_\_\_\_\_

N°	Measure to implement	Deadline	Responsible	Measure implemented		Remarks	Checked	
				Date	Visa		Date	Visa

Next check on the:

(recommended every 6 months)

## Sources

CSD Engineers, Switzerland/ISSPPRO, Germany, 2015

United Nations Industrial Development Organization (UNIDO), 2015

United Nations: Globally Harmonized System of Classification and Labelling of Chemicals (GHS), 2003, last revision 2013

Suva: Liste de contrôle – Stockage de liquides facilement inflammables, Switzerland, 2011

ECA: Incendie et éléments naturels: Distances de sécurité. Cours spécialiste en protection incendie AEAI, Switzerland, 2011

Suva: Santé et sécurité au travail lors de l'emploi de solvants, Switzerland, 2012

Suva: Bouteilles à gaz – Entrepôts, rampes, systèmes de distribution de gaz, Switzerland, 2007