Checklist

Explosion Protection

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 explosion hazards as illustrated in the "Explosion Protection" presentation. 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 8.

Inventory of flammables liquids, gases and dusts

Please fill in the following table and checklist for each storage or working area.

Storage premises or working area

Flammable substances, groups of flammable substances (e.g. highly flammable liquids)	Maximum quantity [kg]	Characteristics (e.g. flash point, minimum ignition temperature)

1	Have you checked if it is possible to substitute flammable substances with less dangerous substances? *For example: Non-flammable substances or non-flammable liquids with a flash point greater than 30 °C, pellets or pasty products*	☐ Yes ☐ Partially ☐ No
2	Have you classified the areas presenting an explosion hazard in zones? (Figure 1)	☐ Yes ☐ Partially ☐ No

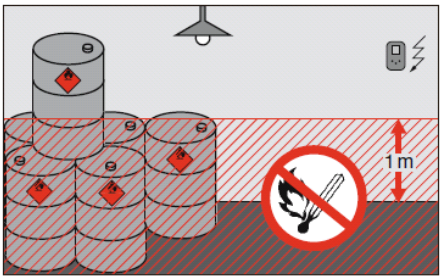

Figure 1: Zone 1 in a storage site
Source: Suva

Storage premises and working areas

3	Are containers, installations, equipment, pipes, etc. protected against excessive thermal impact? (Figure 2) *For example: premises built as fire compartments, observance of safety distances, construction with fire-proof materials, etc.*	☐ Yes ☐ Partially ☐ No
4	Have containment measures (safety sills, retention basins) been taken to prevent the spread of liquids in premises and pipes? (Figure 3)	☐ Yes ☐ Partially ☐ No
5	Are installations and work equipment placed in such a way that gases and vapours cannot spread in dangerous quantities in cavities, pipes, etc.?	☐ Yes ☐ Partially ☐ No
6	Are storage premises for flammable gases and liquids appropriately ventilated? (Figure 4) - Artificial or natural ventilation (air renewed three to five times per hour) - Artificial ventilation mandatory for basement-level premises - Suction opening at floor level for gases with a greater density than the air - Suction opening at ceiling level for gases with a lower density than the air	☐ Yes ☐ Partially ☐ No
7	Are working areas sufficiently ventilated? (Figure 5) - At source ventilation - Air renewal about ten times per hour	☐ Yes ☐ Partially ☐ No

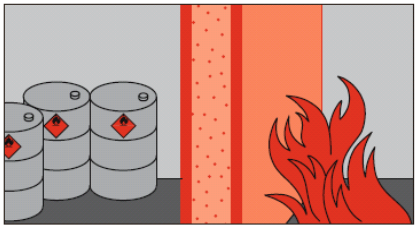

Figure 2: Protection of containers against thermal impact
Source: Suva

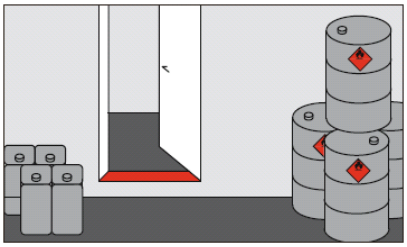

Figure 3: Containment measures (safety sills)
Source: Suva

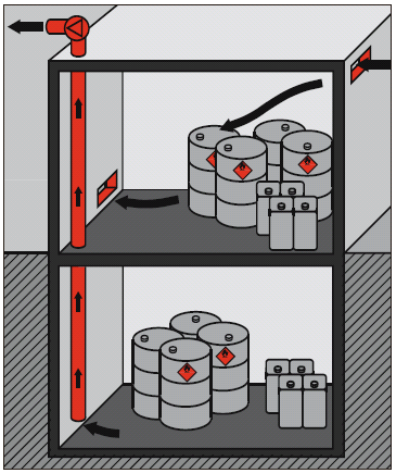

Figure 4: Ventilation of the storage premises
Source: Suva

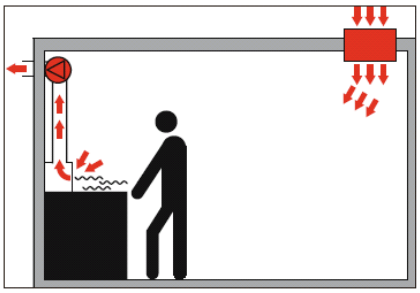

Figure 5: The efficiency of the ventilation system highly depends on the air circulation
Source: Suva

8	Are ventilators that are located in the airflow of the evacuated air designed and installed in such a way that they cannot become an ignition source? *They should not produce any electric or mechanical sparks.*	☐ Yes ☐ Partially ☐ No
9	Does the location of the ventilation openings/outlets allow a safe evacuation of gases and vapours? *For example: On roofs, no ignition sources should be located near the air outlets.*	☐ Yes ☐ Partially ☐ No
10	Are storage premises and tanks only accessible to authorized persons? *For example: Non-authorized access is blocked by a fence.*	☐ Yes ☐ Partially ☐ No
11	Is an escape route ensured? *For example: direct access to fresh air, corridors forming a fire compartment, doors opening in the direction of the escape route* *Escape routes and emergency exits should be appropriately indicated and free of obstacles.*	☐ Yes ☐ Partially ☐ No
12	Are all effective ignition sources eliminated in zones presenting an explosion hazard? (Figure 6) *Possible ignition sources: flames, hot surfaces, mechanical/electric sparks, static electricity, lighting, etc.*	☐ Yes ☐ Partially ☐ No

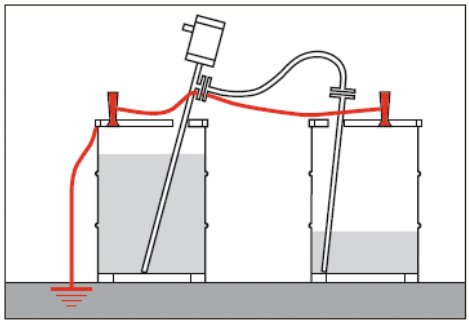

Figure 6: Ground all conductor elements to avoid the formation of static electricity
Source: Suva

Installations, equipment

13	Is equipment used in accordance with the classification of explosion hazard zones?	☐ Yes ☐ Partially ☐ No

14	Are installations and equipment designed as closed systems? (Figure 7) *For example: gas return line, sealed containers, etc.*	☐ Yes ☐ Partially ☐ No
15	Are installations (containers, pipes, plumbing, control units, etc.) dimensioned to resist the expected overpressure under normal conditions of use?	☐ Yes ☐ Partially ☐ No
16	Are construction measures taken when explosion prevention measures are ineffective or only partially effective?	☐ Yes ☐ Partially ☐ No
17	Are installations (containers, pipes, etc.) placed and protected in such a way that they resist the expected mechanical stress? *For example: protection against shock*	☐ Yes ☐ Partially ☐ No
18	Are containers, pipes, etc. clearly and permanently marked? (Figure 8)	☐ Yes ☐ Partially ☐ No
19	Are measures taken to avoid the accumulation of combustible dusts, remove dust accumulations and prevent their dispersion? (Figure 9) *For example: Remove unnecessary horizontal surfaces, use movable or stationary extraction units for dust.*	☐ Yes ☐ Partially ☐ No
20	Are small quantities of highly flammable liquids (up to 100 litres in total) stored in fire-proof cabinets when used in working areas?	☐ Yes ☐ Partially ☐ No
21	Is personal protective equipment (PPE) available to workers?	☐ Yes ☐ Partially ☐ No

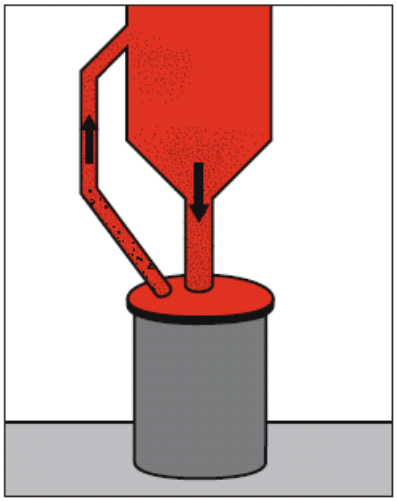

Figure 7: Closed systems prevent the release of flammable substances
Source: Suva

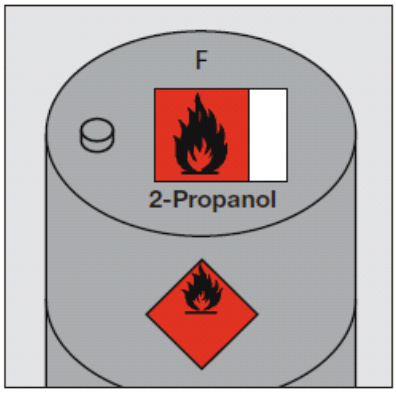

Figure 8: Correctly marked containers
Source: Suva

Figure 9: Dusts removed by aspiration
Source: Suva

Organization

22	Are storage zones and working areas that are exposed to explosion hazards clearly indicated by safety signs?	☐ Yes ☐ Partially ☐ No
23	In working areas, are flammable substances only stored in limited quantities (only quantities required for the daily work flow)?	☐ Yes ☐ Partially ☐ No
24	Are containers with flammable substances (liquids or solids) closed when not in use?	☐ Yes ☐ Partially ☐ No
25	Is thermal impact in storage and working areas reduced to a minimum? Are flammable substances stored separately from oxidizing substances? (Figure 10) *For example: storage of flammable substances separately from packaging materials*	☐ Yes ☐ Partially ☐ No
26	Is appropriate cooling and extinguishing equipment available? (Figure 11) *For example: extinguishers, sprinklers, etc.*	☐ Yes ☐ Partially ☐ No
27	Are safety instructions available? *For example: safety instructions available in the vicinity of installations and equipment*	☐ Yes ☐ Partially ☐ No
28	Is there an emergency plan for exceptional situations? The emergency plan should describe the appropriate measures to follow depending on the situation. *For example: intervention plan, organization of the safe evacuation of workers, intervention of the rescue services*	☐ Yes ☐ Partially ☐ No

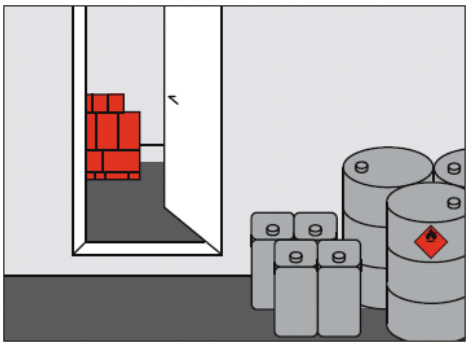

Figure 10: Storage of flammable substances in separate premises
Source: Suva

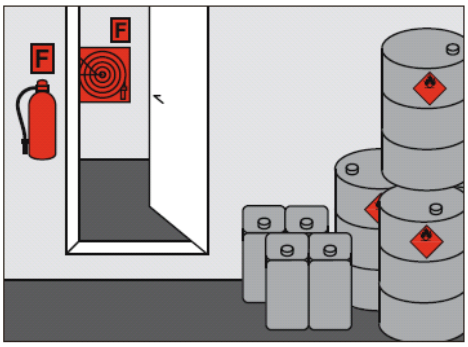

Figure 11: Cooling and extinguishing systems
Source: Suva

Instructions, maintenance and coordination

29	Have (temporary and permanent) staff received training on the risks and safety measures at the beginning of their employment and at regular intervals?	☐ Yes ☐ Partially ☐ No
30	Are installations regularly maintained by experts? *For example: maintenance instructions, recording of maintenance work*	☐ Yes ☐ Partially ☐ No
31	Is the intervention of third-party companies coordinated so as to ensure the safety of the workers?	☐ Yes ☐ Partially ☐ No

Checklist filled in by: Date: Signature:

Checked premises:

Measures planned:
Explosion prevention

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

Suva : Liste de contrôle – Risques d’explosion, 2013, Switzerland