Planning hazardous materials stores properly

A guide to safe planning

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As a planner or operator* of a hazardous materials store, this guide will help you understand which mistakes to avoid during planning and which aspects to consider in order to ensure your project runs as smoothly as possible.

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Introduction

Planning a hazardous materials store is a complex operation. For the legally compliant storage of hazardous substances several areas of law must be considered **as a whole** and **brought in line together**, such as occupational health and safety law, water law, chemical law and building law. Often the **basics for planning**, such as the preparation of a risk assessment or a fire protection design, are missing. Sometimes no-one has taken into account which **building law requirements** must be observed at the installation site, for example in a water protection area. The **specifications from the insurance company** should also be clarified and included as early as possible in order to prevent incorrect planning.

In addition to the numerous legal regulations, there are other aspects that are often neglected. For outdoor installation, for example, a **foundation** is required that meets the **specifications of the storage system manufacturer**. For indoor installation, there must be **sufficient space for manoeuvring** the hazardous material store and you need to ensure that additional loads during transport are absorbed by the statics of the building or the nature of the floor. Last but not least, the **available budget** is a significant factor when choosing a storage system.

With all these things to consider, comprehensive and forward-looking planning is essential. Otherwise, safety may not be fully guaranteed. There is a risk of **additional costs** and **delay in commissioning** if the authorities do not grant approval.

This white paper covers which **typical mistakes** may come into play during planning. This is also a practical **checklist** to help ensure your project runs smoothly.

This is not legal advice. The specialist information in this document has been compiled to the best of our knowledge and belief without any claim to completeness and is intended to provide a guide to the topic. For specific cases, please contact the appropriate supervisory authority.

** For reasons of better readability, the simultaneous use of male, female and diverse (m/f/d) forms has been omitted.*

A hazardous materials store that cannot be operated.

Planning a hazardous materials store is a responsible task. In the worst case scenario, after investing a lot of time and money, the hazardous materials store cannot be operated due to a **missing approval.** There can be many reasons for this, as a lot of things have to be taken into account. Planning companies are often entrusted with this task. However, even they are usually not specialised in the intended use, so that **close coordination with the manufacturer of the hazardous material store** is generally recommended.

It is also advisable to coordinate with the relevant authorities, insurance companies, safety and fire protection officers and the fire brigade at an early stage. **Subsequent improvements are usually more expensive** than when all the details have already been clarified before construction. Also the employees who will later use the warehouse should be considered. The time saved by user-friendly **equipment** should not be underestimated.

In the last stage, commissioning can also be delayed by the fact that the **necessary structural and/or space requirements** for installation have not been ensured, which causes unnecessary additional costs.

The planning of a hazardous materials store is as individual as its subsequent use. In addition to safety and economy, many other aspects such as the installation situation, user-friendliness, etc. must be taken into account. Take advantage of the advice provided by the hazardous material store manufacturer, if possible on site.

Everything from a single supplier – how to ensure planning safety.

As when building a house, costs can initially be saved when constructing a hazardous materials store by splitting services. However, savings are often made at the wrong time, because when **responsibilities change**, there is also often a **lack of information**. Not so when everything is supplied from a single source.

Starting with **manufacture** of the steel structure for the hazardous materials store, through **fitting out** with necessary equipment, such as electrical devices and air-conditioning and monitoring technology, to **delivery, installation and commissioning**, it is possible to source all these services from one supplier. Those who plan with foresight also take into account the subsequent need for legally prescribed **maintenance measures** when purchasing a hazardous materials store.

Companies that offer such a full service are usually **experts with a holistic view of individual requirements** and have sufficient resources to support you throughout the entire planning and acquisition process.

The advantages of a complete offer are obvious: you have one contact person who covers all services you might need. This eliminates the time-consuming coordination of additional suppliers or service providers. You'll also benefit on the cost side, as a full-service offer often comes at an all-inclusive special rate.

6 typical planning mistakes

Experience plays an important role in any planning. As we all know, the best lessons can be learned from mistakes. For this reason, we have compiled a list of typical mistakes that we frequently encounter.

1. The legal requirements are not considered holistically.

A hazardous materials store is considered an operating area with **increased risk potential.** For good reason, there are therefore many legal requirements that define **protective measures**. Anyone storing, transporting or processing hazardous materials not only has to comply with chemicals legislation. The provisions of environmental law, occupational health and safety law and public building law must also be complied with.

In the case of a hazardous materials store, an **increased fire risk** is generally assumed. A fire protection plan must be included in the planning stage, from which an **object-related fire protection design** is derived. This must usually be presented in the approval procedure.

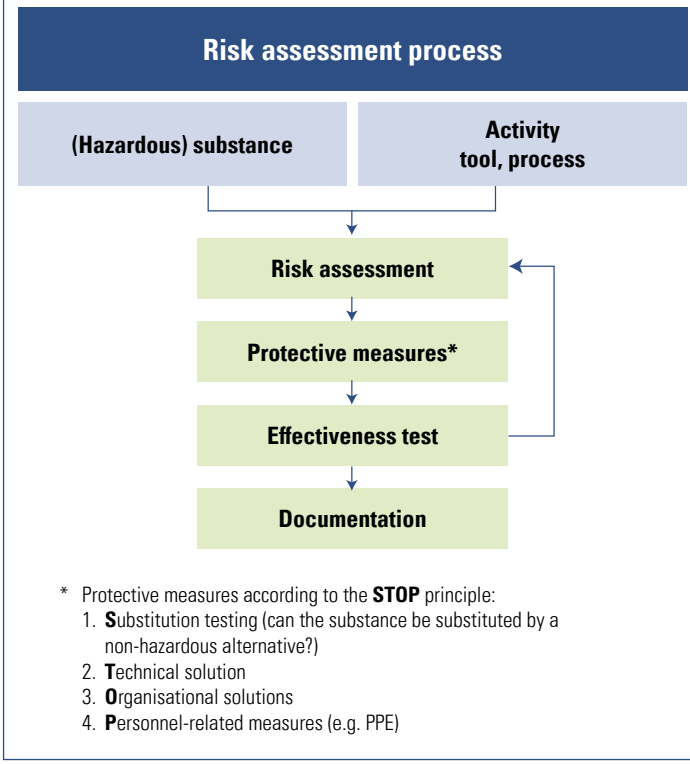
Similarly, a hazardous materials store may pose a risk of causing damage to water – in terms of liability law it is therefore a **facility under the Water resources law** (WHG store). This requires consideration of the requirements of the Regulation on equipment for handling water-polluting substances (AwSV). It is expected that by the end of 2021, this regulation will also require fire water retention facilities, which were included in the building regulations until the end of 2019.

2. No risk assessment has been prepared or considered.

The risk assessment is the central element in occupational safety and health at work and the basis for systematic and successful **safety and health management.** Before starting an activity with hazardous substances, a risk assessment must be carried out in order to reliably design responsible handling measures. Although **safety data sheets** provide a good guide, they alone are not sufficient to plan a hazardous materials store. There can be serious consequences if, for example, **fire protection or ATEX assessments** are not available. This is because the operator is responsible for producing a fully comprehensive risk assessment.

If important requirements from the safety data sheet or the risk assessment were not taken into account when determining protective measures, this can also have serious, even life-threatening consequences. If, for example, temperature-sensitive substances are not stored within the prescribed temperature range, this can lead not only to damage to the product. Fires or explosions can result, as for example in the storage of organic peroxides (LGK 5.2).

Legal requirements diagram



Risk assessment process diagram

3. Budget and planning do not match.

The **general conditions for planning** are already determined by the type and quantity of hazardous substances to be stored and the risk assessment. If the budget is planned "from a gut feeling" before the framework conditions are clear, the difference compared to the **actual costs** can be significant. If no budget increase is then possible, the planned activities or capacities cannot be realised. This can have an immediate time and monetary impact on overall operational planning.

4. Requirements are made that are superfluous or do not make sense.

A plan might be suitable for approval, but still entail unnecessary costs. These costs can **add up** during operation. If, for example, a dark paint finish is chosen for a hazardous materials store with air-conditioning in an area with high solar radiation, and a high air exchange rate is also planned, these measures have a **counterproductive effect**. A lot of energy will be expended unnecessarily. An experienced advisor will be able to warn you about this.

5. The planned hazardous materials store does not take local conditions into account.

If you disregard local conditions, this can result in the hazardous materials store not meeting the **requirements of the state building code** and you being denied approval.

For example, check at the beginning of the planning stage whether the installation site is located in a **water protection area**, because the store must then be designed accordingly. **Local wind, snow and earthquake loads as well as corrosion conditions must also be considered.**

You should also reach an agreement with your insurance company at the planning stage so that the insurance cover takes effect in the event of damage.

6. The necessary installation requirements were not taken into account.

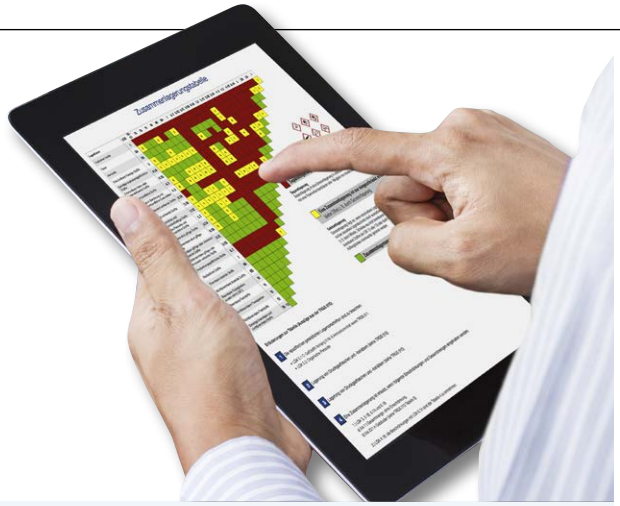
When installing a hazardous materials store outdoors, the **foundation** forms the static basis for stability. Loads are dissipated into the ground in a defined way. A slope must be avoided at all costs when laying the foundation. In addition, a **power supply line** and **earth point** should be routed in the foundation. To do this, a properly authorised architect must submit a **building application**. These are all additional costs that you should also keep in mind.

In addition to the actual store, areas must be planned that serve as **manoeuvring areas** for adding or removing containers. In accordance with §14 AwSV, they are to be considered as **part of this installation** and to be **paved** to a prescribed extent and with a suitable construction method as well as to be provided with a **targeted drainage system**. This should certainly be taken into account when planning the foundation.

The static requirements also include anchoring the hazardous materials store to the ground. If the installation takes place on so-called '**WHG floors**', only trained and certified specialists may carry out anchoring involving a complex procedure.

Checklist for safe planning

When planning a hazardous materials store, there are many points that play an important role: which regulations must be considered? Which substances are to be stored? Do certain temperatures need to be maintained? What are the operational conditions?



Use this checklist to tick off the important planning factors.

1. **Which hazardous substances are to be stored?**
Special precautions must be taken for hazardous substances depending on their properties and hazard potential. These are mainly specified by the Technical Rule for Hazardous Substances (TRGS) 510. Depending on the quantity and the hazardous properties of the substance, specific regulations for storage may apply. For acids or alkalis, for example, a stainless steel spill pallet or a resistant PE inliner should be chosen. For flammable media, fire prevention legislation needs to be observed. If an explosive atmosphere is present, **ATEX Directive 2014/34/EU** must be observed. If different media are to be stored together, the **combined storage regulations** in accordance with TRGS 510 must be observed. ☐

2. **How are hazardous substances classified?**
Every hazardous substance is classified in a **storage class (LGK).** The classification is made using the data in the safety data sheet or the packaging labelling. It is used for determining the ways to store different hazardous substances together in accordance with TRGS 510 in order to avoid an increase in risk. Depending on the **water hazard class (WGK)** as well as the storage quantities of water-polluting substances or the size of the plant, spill pallets with the corresponding containment volume and, if necessary, **extinguishing water retention devices** are required as water protection measures. ☐

3. **What are the specifications in the safety data sheet?**
Among other things, the safety data sheet contains information on **safe storage conditions.** These include, for example, special requirements for storage rooms or containers (including retaining walls and ventilation), incompatible materials, storage conditions (temperature / air / humidity / light etc.), special requirements for electrical systems and equipment, measures against electrostatic charging, as well as suitable extinguishing systems. ☐

4. **What quantities are to be stored?**
Depending on the quantity, and in consideration of the **hazardous properties (H-phrases)** of the hazardous substances to be stored, the type of storage must be determined (e.g. storage outside of warehouses, storage in a safety cabinet, storage in an F 90-protected storage room) and, if necessary, safety distances to be observed.
For small containers **walk-in hazardous materials stores** with variable shelving or **FWF 90 hazardous materials cabinets** are ideal, depending on the quantity stored. For larger, individual containers, compact technical room systems are suitable or for larger quantities, hazmat stores with shelving are appropriate. ☐

5. **What special measures result from the risk assessment and the fire protection design?**
If special protective measures are derived from your assessment, these are to be taken into account in the planning and their technical feasibility is to be checked. ☐

6. **How will the hazardous materials store be loaded?**
The type of loading (manual / drum trolley / pallet truck / forklift) will determine if the store needs to be **accessible underneath** for example, or if the **entry sill** can be crossed using an access ramp. ☐

Which building requirements should be considered?
Since the erection of a hazardous materials store is usually a construction project, building law requirements must be checked. A **building permit** is usually required for outdoor installation. In the case of indoor installation, **notification of a change of use** may have to be submitted.

7. In accordance with German building law a mobile room system is classed as a so-called **unregulated building product**. **General Technical Approval** must be obtained for this type of building product. This is given by the Deutsches Institut für Bautechnik (DIBt). General Technical Approval gives reliable proof of **suitability for storing hazardous substances in accordance with the applicable regulations.** The approval is based on tested structural analysis. This facilitates handling of the approval procedure as well as rapid commissioning of a hazardous materials store, since determination of suitability and an individual acceptance are no longer necessary. The manufacturer of the room system should be able to prove that a corresponding approval is available. This approval is usually limited in time and should be checked for validity before purchase. ☐

Local conditions also play an important role. So, for example, special technical and organisational measures are required for the storage of hazardous substances in a **water protection area**. **Local wind, snow and earthquake loads or corrosion conditions must also be considered.** Find out from your competent authority which specific building law conditions you have to observe.

8. **Is dispensing or filling of substances to be carried out in the hazardous materials store?**
When dispensing or filling hazardous substances, increased safety measures must be planned, especially if the storage medium is a flammable substance. Technical protective measures include, for example, provision of **technical ventilation** to maintain the prescribed air exchange rate, **air extraction monitoring, fire and explosion protection measures** as well as the installation of **equipotential bonding** for earthing. ☐

9. **Do specific storage temperatures have to be guaranteed?**
For temperature-sensitive substances, hazardous materials stores with **thermal insulation** and **heating/air-conditioning technology** are primarily used in order to comply with the substance-related temperature limits usually described in the safety data sheet. ☐

10. **Is everything prepared for the installation of the hazardous materials store?**
To ensure a smooth process during assembly and commissioning, all preparations (e.g. foundation work) should have been completed in advance and the space and conditions for heavy goods transport for delivery (incl. unloading) should have been checked. ☐

Links to DENIOS

Risk assessment –
Fire protection

» www.denios.co.uk/risk-assessment

Storing hazardous materials
together in compliance with TRGS 510

» www.denios.co.uk/ghs-regulations

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DENIOS AG, based in Bad Oeynhausen, Germany, has been a developer and manufacturer of products and solutions for the safe storage and handling of hazardous materials and work safety for more than 35 years.

» www.denios.de/unternehmen

Advice from DENIOS.
Professional and individual.

Are you unsure whether you are meeting the operator obligations? Do you know whether your hazardous materials store complies with current legislation, would pass an official inspection or if the insurance cover still exists? We are here for you and can always carry out an on-site review. Just get in touch!

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