



Manufacturing Intelligence:

# Warehousing and Storage



# Manufacturing Processes

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Risk Features

Material Damage  
and Business  
Interruption Hazards

We know that your clients take risk management seriously and that it plays a key role in the service you offer. We've produced this guide to highlight the controls and prevention measures your clients can take to help reduce the risks associated with storage in warehousing.

## Trade overview

In the UK, logistics warehousing and distribution is a big industry becoming more focussed post Brexit and with the increased demand related to the growth in online retail sales. As part of the global economy, the UK takes advantage of lower cost imports and it's vital for countrywide distribution for both the supply chain supporting manufacturing and distribution of products.

Warehouse buildings are also becoming larger with high bay storage, multi-level mezzanines plus automated storage and retrieval systems.

According to Savills and the UK Warehousing Association (UKWA), there's an estimated 39 million square metres of storage space in the UK. Knight Frank have estimated that due to the growth in e-commerce with the shift in consumer behaviour, there could be demand for an additional 8.5 million square metres by 2024.

A large proportion of manufacturing sites and other facilities will also contain some kind of storage facility, either attached to the main premises or a stand-alone building. This guidance will apply equally to both.

## Process

Warehousing mostly operate at ambient temperatures, but in the food sector particularly, they can be chilled and/or frozen. This can mean the use of insulated combustible elements of construction to the building envelope or internal building linings for temperature control.

Mechanical handling plant is a key feature for product movement. High risk goods stored within warehousing such as highly flammable liquids, hazardous chemicals or fertilisers may require tight control of sources of ignition. Such sources include those from frictional static build up from use of handling plant or conveyor systems.

Some facilities are becoming part or fully automated for product picking, but in many cases, there's a mix of handling plant and employees, so the risk of injury remains present. Falling stock and / or collapsing overloaded racking continues to be an issue.

There can also be ancillary services within warehousing that shouldn't be forgotten such as vehicle servicing and repair workshops, vehicle fuel storage or electrical charging facilities as well as the administration functions in offices.



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## Business Interruption

A fire within an unsprinklered warehouse has a high chance of resulting in a total loss of the building and contents due to the uninhibited spread of fire through a combination of open plan layout space, combustible commodities and packaging and sometimes highly flammable storage. In the event of a loss, customer goodwill can be lost, due to the immediate delays that ensue. If the products destroyed are part of a supply chain, there will be disruption creating inability to fulfil delivery with potentially disastrous consequences, especially if a 'Just in Time' strategy is relied upon.

Warehouses are generally quick to rebuild, although the availability of local empty warehouses for short term lease may not be sufficient, meaning employee travel maybe disrupted. A Business Impact Analysis (BIA) will assist in identifying the areas of threat to put solutions in place to mitigate the risks attached. This could, for example, involve separate storage facilities to avoid a total loss and maintain supplies to key customers.



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### Employers Liability

The main liability exposures in warehouses are associated with the use of workplace transport and handling activities. The severity of injury is often very high through workplace transport accidents.

It's important that the standard of driving involving forklift trucks is continually monitored on a regular basis. Indicators of poor driving include damage to workplace transport plant, impact damage to racking or building fabric, tyre marks on floors and damaged goods. In some instances, where there's a high volume of workplace transport incidents, driver profiling may be necessary and decisive management action taken to reduce the potential for injury.

Warehouse sites should be carefully planned and the need for reversing avoided wherever possible. The use of dock levellers, forklift trucks and loading goods vehicles present particular risks.

Regular inspections and condition checks of vehicles are essential, along with statutory examination of load bearing parts. Routine servicing of vehicles should be in place and all vehicles should be maintained in accordance with the manufacturer's instructions.

In warehouses storing chilled or frozen goods, refrigeration systems contain ammonia which is an odourless, colourless gas. Owing to its toxicity, it's important that adequate controls to prevent release are in place.

Musculoskeletal injuries are common from incorrect handling and kinetic movement activities. These generally arise because the task hasn't been risk assessed properly and/or adequate training hasn't been provided. All manual activities need to be thoroughly assessed. Training should be provided by a competent individual or organisation. All training should be recorded and detailed assessments need to be made available to employees, taking into account specific needs of individuals.

### Public and Products Liability

Public Liability incidents can arise where there's a lack of control around visiting drivers, members of the public and other third parties to the premises. Access for third parties must be strictly controlled in order to prevent injury.

Products Liability is most likely related to cross contamination, mis-storage of product or damage to products in storage. All products need to be stored in accordance with the manufacturer's instructions and within the specified temperature range. Certain products may need to be stored away from strong odours and foodstuffs should always be stored in hygienic conditions.



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### Material Damage

The result of a fire not only impacts on material damage, but can have dramatic effects for business interruption (see earlier). Despite their high cost, sprinkler protection in such facilities has a proven benefit in significantly reducing the impact of any fire.

Preventing the potential for a fire through good management loss prevention procedures is fundamental to overall control.

Arson is a regular cause of fire within warehouses, as external combustible storage such as pallets are often present. A malicious fire involving pallets can typically enter the building. The use of powered handling plant can be a source of fire either from electricity (battery charging), diesel or LPG (fuel release). Sources of electrostatic discharge will also need to be addressed where a flammable atmosphere exists.

Storage of flammable or dangerous goods will require special consideration and local authority planning approval. In high volumes the location may need to be registered as a COMAH (Control of Major Accident Hazards) Regulations 1999 (as amended) site.

In chilled or frozen storage facilities, the presence of combustible insulated wall and roof panels still presents an issue, particularly where the panels are polystyrene cored. Refrigeration systems in warehouses can use ammonia gas which if released is combustible in air at the right concentrations.

In otherwise moderate fire risk warehouses, there's always the chance that small quantities of flammable substances, most notably in aerosol canister form may be present. Involvement of flammable aerosols in a fire creates an additional hazard as they explode and unless contained correctly will be propelled throughout the premises, setting additional fires as they land.



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The tables below highlight some specific hazards present in warehousing and storage, along with the associated controls which will help prevent major loss resulting in physical damage and consequent business interruption. Generic risks resulting from arson, electrical sources and waste aren't mentioned here.

## Features always present

Hazard	Control
Fire risk from mechanical handling plant battery charging	<ul style="list-style-type: none"> <li>▪ Battery charging area to be clear of combustible materials to at least 2 metres (guard rails and floor markings often work well to assist in control).</li> <li>▪ Adequate natural or mechanical high-level ventilation to be provided and the charger to stand on an impervious, non-conductive and non-combustible base.</li> <li>▪ In larger premises, a separate charging compartment with fire rated walls and roof may be necessary. Hydrogen gas detection systems linked to automatic charging isolation may be needed.</li> <li>▪ Regular maintenance of plant, particularly electrical systems.</li> </ul>
Fire risk from the use and storage of LPG (Liquefied Petroleum Gas)	<ul style="list-style-type: none"> <li>▪ LPG cylinders to be held in external locked cages and protected from sunlight. There should be no smoking around the area enforced.</li> <li>▪ Any empty LPG cylinders to be removed frequently.</li> </ul>

Hazard	Control
Risk of fire from arson	<ul style="list-style-type: none"> <li>▪ Full security check of the premises and site.</li> <li>▪ Removal of combustible external storage or keep as far away as possible from the building.</li> <li>▪ Enclosing the site with permanent and substantial fencing will act as a deterrent to any opportunistic arsonist.</li> <li>▪ Any guarding of sites should include CCTV so that the whole perimeter of the building can be monitored.</li> </ul>



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## Features sometimes present

Hazard	Control
Fire risk from static build up from mechanical handling plant or any conveyor systems (in flammable atmosphere environments)	<ul style="list-style-type: none"> <li>Ensuring plant uses antistatic tyres and earthing straps (other requirements may also be required where an explosive atmosphere is present).</li> <li>Conveyor systems to also be earth bonded.</li> </ul>
Fires spreading from the use of polystyrene composite wall and ceiling panelling and internal insulation forming “compartments”	<ul style="list-style-type: none"> <li>Replacement of existing panels with LPCB approved products (further discussion with AXA is recommended). This can be a phased approach starting with the highest risk areas.</li> <li>Suitable panel management system to be adopted including regular panel inspections and maintenance to prevent further deterioration in the panel condition.</li> <li>Where panel breaches are found then the insulation core to be protected and any services passing through the panel should be encased in suitable non-combustible collars / glands.</li> </ul>
Fire involving aerosol canisters within storage racking (small volume storage) where containing a flammable substance	<ul style="list-style-type: none"> <li>Ensure all storage is within locked cages to ensure canisters can’t escape if they become involved within a fire.</li> <li>Separate discussions may be required with AXA for any large scale storage of aerosol products.</li> </ul>

Hazard	Control
Storage of flammable/highly flammable liquids, gases or aerosol canisters	<ul style="list-style-type: none"> <li>Undertake an assessment in compliance with the Dangerous Substances and Explosive Atmospheres Regulation 2002 (DSEAR) and implement the recommendations.</li> </ul>



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### Employer's Liability and Public Liability

Hazard	Control
Fire risk for multi floor	<ul style="list-style-type: none"> <li>Fire risk assessment completed to consider construction, layout, nature and quantities of goods stored, packaging, location, environment, people present and activities etc. and remedial control measures implemented.</li> <li>Adequate training of all staff (e.g. evacuation drills) and regular maintenance of passive and active protection systems.</li> </ul>
Accidents from the use of workplace transport	<ul style="list-style-type: none"> <li>Robust selection and induction of drivers with due consideration of experience, skills, training and attitude; adequate supervision.</li> <li>Selection and use of the correct mechanical handling plant for the task and environment.</li> <li>Consideration of the layout of the site – use of one way systems to reduce the need for reversing; lighting; use of trained banksmen as necessary.</li> </ul>
Injury through inappropriate manual handling	<ul style="list-style-type: none"> <li>Risk assessment and minimisation of manual handling activities through the use of appropriate mechanical handling devices (provided with requisite training).</li> <li>Residual handling managed by assessment of task and provision of adequate training to staff, with regular review and refresher training.</li> </ul>

Hazard	Control
Escape of ammonia gas in temperature controlled environments	<ul style="list-style-type: none"> <li>Use of appropriately designed, installed and maintained refrigeration plant.</li> <li>Ammonia gas detectors provided in plant areas.</li> <li>Ammonia release evacuation and emergency plan appropriately communicated, tested and reviewed.</li> </ul>
Personal injury from loading of goods vehicles via bays with dock levelling devices	<ul style="list-style-type: none"> <li>Use of controlled and closely supervised safe systems of work to include secure retention of goods vehicle keys while loading continues to avoid premature departure from dock.</li> </ul>
Accident through work at height	<ul style="list-style-type: none"> <li>Avoidance of work at height wherever possible with safe collective means of access provided with preference over personal protection; adequate training. e.g. use of raised walkways with safety rails to aid access.</li> </ul>



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## Products Liability

Hazard	Control
Incorrect storage and handling	<ul style="list-style-type: none"><li>Follow manufacturers guidelines for storage and handling.</li></ul>
Failure to suitably control temperature where there are temperature sensitive goods	<ul style="list-style-type: none"><li>Ensure appropriate monitoring devices are in place, with procedures for recording data and acting upon deviation from permitted parameters.</li></ul>



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