

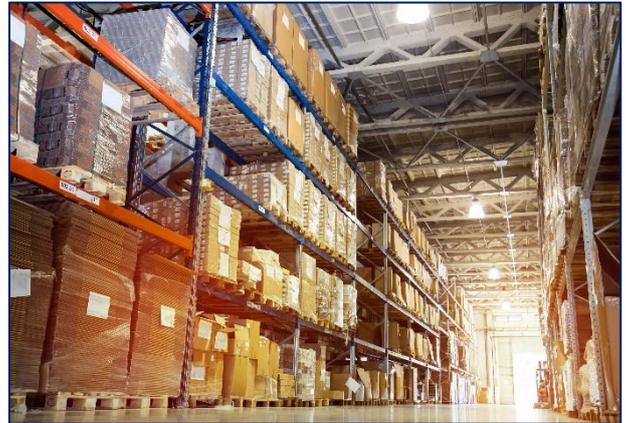
Loss Prevention Standards

Internal High Piled Storage (Non-Sprinklered Building)

Introduction

High piled storage is commonly used in warehouses and other storage locations, as it allows more goods to be stacked in a given area, helping to reduce storage costs to businesses. However, there are several risks and hazards associated with high piled combustible storage that are not always considered, which can pose life safety risks and increase the risk of fire, as well as increase the potential for property damage and business interruption. This additional quantity of storage and the height to which it is stored, will have a serious effect on the speed at which any fire will develop throughout a property.

This document considers the issues with storage inside a non-sprinkler protected, non-hazardous atmosphere building. The key with any fire risk management is to minimise the possibility of a fire starting, i.e. prevent the fire triangle from being formed.



Keeping ignition sources away from combustible materials is a critical element. For storage this is sometimes not as easy as it first seems: light fittings or bulbs, electrical panels, heaters, battery charging, fork lift trucks, hot work, desk areas and cubby holes (which may house kettles, refrigerators, mobile phone chargers) etc., are examples of items which can all cause fires. Once a fire has started, and all fires start small, the issue is then how quickly will the fire grow. The height and arrangement of the storage, and the actual nature of what's being stored all add to the issues that can exacerbate the fire growth.

Variables that can affect the impact of, and to storage, in a fire situation include:

- Building
 - Height
 - Pitch and nature of roof
 - Combustibility of construction materials
 - Fire and smoke compartmentation
 - Heat and smoke venting
- What is being stored
 - Commodity itself
 - Hazardous goods such as aerosols, flammable liquids, etc., has specific consideration been given to the storage of these materials?
 - Combustibility of material
 - Smoke susceptibility
 - Packaging including within any of the unit loads
 - Coverings to packaging - shrink wrapped; or more than this; on all sides and the top; sides only
 - Pallets (plastic/wooden)

- Storage arrangements and height (maximum/minimum)
 - Normally
 - Expected trends or seasonal fluctuations
 - Temporary
 - Isn't temporary... its permanent but just for a 'shorter' period of time
 - Arrangements: racked, solid pile, picking, etc.
 - Racked
 - What type and the number of tiers
 - Length and width
 - Shelving: solid, slatted, grated
 - Damage to the racks
 - Solid piled
 - Pile sizes
 - Pile stability – is it going to fall over; what about in a fire
- Separation between storage and general housekeeping
 - Aisle spaces between piles or racks – to limit fire spread and provide egress routes
 - Flue spaces between stacks in solid piles or units in racks
 - Size of flue
 - Spacing of flue

Firefighting access to fires involving high piled storage is often very difficult, due to: storage heights; racking or stock collapse; lack of available space; narrow or blocked aisles; materials of building construction; lack of fire compartmentation; lack of smoke and heat removal; poor fire water supplies; lack of appropriate equipment to fight fires at the highest levels of storage, etc.

Without any automatic sprinkler protection, fires in open-plan warehouses rapidly escalate in size and intensity, so much so that when the fire brigade arrives, if everyone is accounted for and safely assembled outside the building, the only available option to them is to limit fire-fighting operations to external defensive operations, i.e. to stop the fire from spreading to other adjacent/neighbouring buildings.

It is worth understanding that an appropriately designed and installed automatic sprinkler system with accompanying dedicated and reliable fire water supply, to internationally recognised standards, by listed/approved organisations, is the most effective means of fighting a fire at its seat. This is from both a life safety and a property damage/business interruption perspective.

While essential to help raise a fire alarm at its earliest stages, automatic fire detection designed, installed and maintained to an appropriate standard (e.g. BS 5839-1), only alerts you to a fire, it does not suppress or extinguish a fire. Therefore, it is imperative that there is a strong working relationship with your public fire authorities.

Checklist

A generic Internal High Piled Storage (Non-Sprinklered Building) Checklist is presented in Appendix 1 which can be tailored to your own organisation.

Further risk management information can be obtained from [Aviva Risk Management Solutions](#)

Please Note

This document contains general information and guidance and is not and should not be relied on as specific advice. The document may not cover every risk, exposure or hazard that may arise and Aviva recommend that you obtain specific advice relevant to the circumstances. AVIVA accepts no responsibility or liability towards any person who may rely upon this document.

Appendix 1 – Internal High Piled Storage (Non-Sprinklered Building) Checklist

Location	
Date	
Completed by (name and signature)	

	Internal High Piled Storage (Non-Sprinklered Building)	Y/N	Comments
1.	<p>Has a fire risk assessment been completed for all storage areas, individually?</p> <ul style="list-style-type: none"> • Have any and all actions to reduce the risks been addressed? • What is the return period for these risk assessments? 		
2.	<p>Do you fully understand:</p> <ul style="list-style-type: none"> • Commodities stored? • Packaging? • Shrink wrapped? <ul style="list-style-type: none"> ○ On all sides including the top? • On pallets (these should be free from damage and stored on flat surfaces, never on an edge)? 		
3.	<p>Are the stored commodities particularly susceptible to smoke contamination (e.g. food, pharmaceutical, clothing, etc.)?</p>		
4.	<p>Are there any hazardous materials stored and if so, has consideration been given to their storage arrangements?</p> <ul style="list-style-type: none"> • Flammable or combustible liquids? • Gases? • Aerosols? • Oxidising agents? <p>Note:</p> <ul style="list-style-type: none"> • Small amounts – Are normally closed approved flammable liquids cabinet in use? <ul style="list-style-type: none"> ○ Are non-compatible materials separated and segregated in different cabinets? ○ Are cabinets segregated and separated from general storage? • More than cabinet volumes – Are there specially designed storage areas available? <p><i>Dispensing of flammable liquids should not be carried out in storage areas.</i></p>		



	Internal High Piled Storage (Non-Sprinklered Building) Contd.	Y/N	Comments
5.	Are inspections undertaken of all goods on arrival to identify and segregate dangerous/hazardous goods immediately, and to ensure that they are stored in designated areas of the premises?		
6.	Has a business interruption assessment been completed to assess what affect a fire in the storage areas might have on the business operations and profitability of the facility? Could this impact any manufacturing facilities?		
7.	Are you aware of the construction materials of the building? Are combustible materials clearly identified and recorded on site plans?		
8.	Does your roof have trusses? If so, is the storage maintained at least 1-1½m below the bottom chord of the truss?		
9.	Are there structural steel columns within the storage areas? If so, should these be protected with fire proofing, encapsulation, or coatings?		
10.	Is there appropriate fire compartmentation within the building and in particular the storage areas?		
11.	Are utility, office, manufacturing and process areas/rooms and welfare areas in separate fire compartmented areas to the storage?		
12.	Is storage maintained at least 6m clear of fire compartment wall openings (both sides)? <i>This helps prevent a fire 'jumping' through an open fire door.</i>		
13.	Are any automatically closing fire doors, shutters, dampers, etc. actuated by automatic fire detection?		
14.	Is there a comprehensive automatic fire detection system connected to a constantly attended location or Alarm Receiving Centre?		
15.	Is there heat and smoke venting provided? Automatic or manually activated?		



	Internal High Piled Storage (Non-Sprinklered Building) Contd.	Y/N	Comments
16.	Are the building/internal walls protected against impact damage from being used as back stops for the storage? Is there any damage to any walls?		
17.	Is there a formal emergency response plan, to ensure the resilience of the business? Is the plan purely for evacuation? Is anyone trained to use fire extinguishers or hose reels in a fire involving the storage?		
18.	Do you have a good working relationship with your public fire brigade and do they complete regular familiarisation visits?		
19.	Are you aware of the location of the fire hydrants around your building and in the local public streets? <ul style="list-style-type: none"> • Is there appropriate coverage? • Is there appropriate flow and pressure? 		
20.	Is there a formal hot work management system in place? If work is required, is hot work always considered the last resort?		
21.	Is there formal management of smoking and is smoking prohibited from within the storage areas?		
22.	Is there formal electrical inspection, testing and maintenance regimes in place for all electrical items in the storage areas? <ul style="list-style-type: none"> • Fixed wiring? • Portable appliance testing? • Thermographic imaging surveys? 		
23.	Are electrical panels prohibited from within the storage? If not, is a 1-1½m clear space provided around them?		
24.	Are all light fittings positioned above sterile, clear areas, e.g. walkways? <i>No storage, even temporary, should be housed below lighting.</i>		
25.	Is a 1m clear space maintained horizontally between any storage and the light fittings?		

	Internal High Piled Storage (Non-Sprinklered Building) Contd.	Y/N	Comments
26.	Are all white goods type electrical items (e.g. kettles, lamps, fridges, etc.) and domestic goods type battery charging prohibited from within the storage areas? If not, is a 1-1½m clear space provided around them, both vertically and horizontally?		
27.	Does the building have adequate fixed heating provided (ducted or air conditioning), with frost-stat temperature operating and no portable heaters (frost protection)? <ul style="list-style-type: none"> Is heating appropriate in winter? Are fixed permanent heaters prohibited from within the storage areas? <ul style="list-style-type: none"> Are these located in sterile areas? Is a 1-1½m clear space provided around them? 		
28.	Are any plastic shrink-wrapping operations kept clear of all storage? Are portable hot air guns prohibited?		
29.	Are adequate written self-inspections completed and all actions completed for: <ul style="list-style-type: none"> Fire? Security? Housekeeping? Environmental? Health and Safety? 		
30.	To minimise the impact of water damage is all storage maintained at least 100mm off the floor, e.g. on pallets?		
31.	Are all aisles/walkways maintained clear and sterile? <i>Storage in aisles should be prohibited.</i>		
32.	Is housekeeping as good as it can be, to ensure the premises remain clean, tidy and safe?		
33.	Are the front faces of the stored commodities/units/boxes aligned and in line?		
34.	Is all waste/materials for recycling removed from the storage areas at regular intervals?		
35.	Are any waste balers maintained at least 6m away from storage or within a separate fire compartment? Are any balers appropriately maintained?		



	Internal High Piled Storage (Non-Sprinklered Building) Contd.	Y/N	Comments
36.	Is all fork lift battery charging carried out in a separate dedicated and appropriately arranged area? Is this in a separate fire compartment?		
37.	Are storage piles stable and secure for their expected heights? <ul style="list-style-type: none">No signs of leaning?No damage to any lower level units? Have you considered what would happen if the storage gets wet?		
38.	Is piled storage restricted to maximum block area <150m ² ? <ul style="list-style-type: none">With clear unobstructed surrounding aisles at least 2.4m wide?And/or alternatively fire separated by high, large concrete walls to restrict fire spread and aid firefighting?		
39.	Are any rack legs secured to the floor (they should be)?		
40.	Are the rack legs protected against vehicle or impact damage?		
41.	Is the racking system regularly inspected for damage by trained individuals? <ul style="list-style-type: none">Frequency?Are there any signs of rack leg/racking damage?How are these repaired and is the work undertaken promptly? Note: <i>Racks can collapse and fail prematurely when there is rack leg damage.</i>		
42.	Are cubby holes and workstations prohibited within racking (they should be)?		
43.	Are the goods stored particularly attractive as a theft risk? <ul style="list-style-type: none">Has a security risk assessment been completed?Is a specialist security audit required?		

	Internal High Piled Storage (Non-Sprinklered Building) Contd.	Y/N	Comments
44.	Are automatic fire alarm/detection systems provided throughout all areas with local and remote alarm signalling to an approved Alarm Receiving Centre?		
45.	Additional comments:		

