



# Fire prevention plans

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Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

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# Summary

You must follow this guidance if you are storing combustible waste at permitted sites. It tells you the fire prevention standards you must follow.

These standards must be in your working plan or management system and implemented on your site. If they are not, the Environment Agency may take enforcement action.

You also need to follow this guidance if your permit says you must have a fire prevention plan or if you need to submit one as part of your permit application.

If you don't follow the minimum standards in this guidance, you must be able to justify why. The measures you take instead must be equivalent or superior. You must include detailed modelling assessments to satisfy the Environment Agency that the:

- likelihood of fire
- impact from emissions during or after a fire on local people, critical infrastructure and the environment
- resources required by the Environment Agency and other emergency responders during an incident
- post incident clean-up and remediation costs

are equivalent or less than would be incurred if the site followed the minimum standards in this regulatory guidance.

This document replaces the Environment Agency's previous technical guidance note 'TGN 7.01: reducing fire risk at sites storing combustible waste'.

This guidance doesn't replace any statutory requirements for sites controlled under local acts of parliament, the Regulatory Reform (fire safety) Order 2005 or other applicable legislation.

## Materials this guidance applies to

This guidance applies to all combustible materials including (but not limited to):

- paper or cardboard
- plastics
- rubber (natural or synthetic, including whole tyres, baled tyres, tyre shred, crumb and fibre)
- wood (including planks, boards, sawdust, shavings, logs, firewood or chips, or wood joined to form crates, pallets, casks or barrels)
- fragmentiser waste (from processing end of life vehicles, plastics and metal wastes from materials recovery facilities)
- rags and textiles
- scrap metals
- refuse derived fuel (RDF) and solid derived fuel
- waste electrical and electronic equipment such as fridges, computers and televisions containing combustible materials such as plastic
- compost and plant material
- biomass

## Materials this guidance does not apply to

This guidance does not apply to landfill sites or to the storage of coal, materials or waste that are:

- flammable (flashpoint of 60°C or lower)
- combustible liquids or gases
- hazardous
- dangerous substances stored under the Control of Major Accident Hazards Regulations

Gas cylinders, aerosols and combustible liquids are not covered by this guidance but they should still be considered in a fire prevention plan because of the potential they have to cause or increase the impact of fire on a site.

For advice about other materials and activities not listed above, contact the [Health and Safety Executive \(HSE\)](#), your local [fire and rescue service](#) or the Environment Agency.

## Causes of fires

Causes of fires on your site include:

- arson or vandalism
- self combustion (eg due to chemical oxidation)
- plant or equipment failure
- electrical faults
- naked lights
- discarded smoking materials
- hot works (eg welding or cutting)
- industrial heaters
- hot exhausts
- open burning (on site or adjacent sites)
- damaged or exposed electrical cables
- reactions between incompatible materials
- neighbouring site activities
- sparks from loading buckets
- incompatible wastes
- hot loads deposited at the site

## Fire prevention plan

You must do all that is reasonable to prevent a fire but you can't eliminate all risks. Your fire prevention plan is part of a written management system that includes an assessment of fire risk on your site and the measures in place to prevent, detect, suppress, mitigate and contain fires.

All staff and contractors working on-site must be aware and understand the contents of the fire prevention plan and what they must do during a fire.

Make sure that all staff know where the fire prevention plan is kept. You must have regular exercises to test how well your plan works and make sure that staff understand what to do.

The fire prevention plan must specify:

- the amount and type of waste received daily and how it is managed

- the total amount of waste and the types and forms (eg unprocessed, shredded, chipped, fines or baled) that are stored on site at any one time
- the maximum time each type of waste will be stored on site and how it will be managed
- how each type of waste will be stored
- the maximum volume of each waste pile in m<sup>3</sup>
- the location within the site where each type of waste will be stored
- the maximum size of any waste pile, stipulating the maximum length, width and depth
- the minimum separation (fire break) distance between waste piles or storage areas
- the fire prevention techniques used, including management of hotspots (sign of potential self combustion), monitoring, reporting, recording and actions
- techniques used to minimise the risk of fire spreading within the site or from the site
- the steps and procedures to be followed if a fire occurs on your site
- all combustion products and emissions (to air, land and water) from the fire and the emergency response (including the impact on people, critical infrastructure and the environment) and how they will be minimised
- how safe access to the site for fire and rescue services and other emergency responders is achieved
- a site plan showing:
  - layout of buildings
  - any areas where hazardous materials are stored on site (location of gas cylinders, process areas, chemicals, piles of combustible materials, oil and fuel tanks)
  - main access routes for fire engines and any alternative access
  - access points around the site perimeter to assist fire fighting
  - hydrants and water supplies
  - any watercourse, borehole or well located within or near the site
  - areas of natural and unmade ground
  - the location of plant, protective clothing and pollution control equipment and materials
  - drainage systems, foul and surface water drains, and their direction of flow and outfall points
  - the location of drain covers and any pollution control features such as drain closure valves and firewater containment systems
  - location of key receptors such as critical infrastructure, schools, hospitals, residential areas, workplaces, protected habitats and rivers within 1km of the site
  - compass rose showing north and the prevailing wind direction

You must also consider:

- reducing the amount of firewater run-off generated - use sprays and fogs rather than jets
- recycling firewater if it's not hazardous and it's possible to reuse
- applying water to cool unburned material and other hazards, taking care to prevent this water causing or adding to water pollution and/or increasing air pollution
- separating unburned material from the fire using heavy plant
- separating burning material from the fire to quench it with hoses or in pools or tanks of water (this will reduce the amount of firewater produced)
- burying the fire using soil, sand, crushed brick and/or gravel (if there are limited water supplies and smoke is threatening local people) although you can only do this when:
  - groundwater vulnerability is low

- you have agreement from the Environment Agency
- contaminated material is removed and legally disposed of as soon as it's safe to do so
- controlled burn - a fire fighting strategy that uses limited quantities of water or foam to minimise impacts on human health and the environment (only allowed with prior agreement from the Environment Agency and Public Health England)

To decide which of these options, or combinations of options, is appropriate you must consider the:

- scale and nature of the environmental hazards on site and the activities that take place on it
- risks posed to people, the environment and property
- type of materials you store on site, the form they're stored in and the length of time needed to extinguish a fire involving them
- availability of firewater containment facilities
- local topography, weather conditions and fire scenarios that could reasonably be expected on site

## Preventing fires

Doing everything possible to prevent fire is an important part of your fire prevention plan. You must:

- control sources of ignition such as heating pipes, naked flames, light bulbs, space heaters, furnaces and incinerators
- keep sources of ignition at least 6m away from piles of combustible and flammable materials
- reinforce fire prevention messages using signs
- ensure staff and contractors follow safe working practices when undertaking hot working, such as welding and cutting
- ensure all visitors follow the correct safety and fire prevention procedures
- apply a no smoking policy or ensure designated smoking areas are situated away from combustible materials
- introduce a regular maintenance and inspection programme for all site areas (including site machinery) and minimise fibre and paper in buildings and around the site
- put site security measures in place (eg security fencing, intruder alarms and CCTV) to prevent arson (your arrangements should include outside normal working hours)
- have all site vehicles fitted with fire extinguishers and dust filters
- have all bucket loaders fitted with rubber strips to prevent sparks when the bucket comes into contact with hard-standing etc
- implement a fire-watch at the end of each shift (when dust from processing operations can settle onto hot exhausts and engine parts)
- make sure separation distances are observed between plant and material when the site is not staffed
- provide a dedicated emergency or quarantine area big enough to cope with a major incident, with a clear area of at least 10m around the perimeter (this must be available at all times and identified on your site plan)

## Self combustion

Some materials can self-combust under certain conditions. The risk increases when materials are stored for more than 3 months.

You must ensure that any combustible materials are stored for less than 6 months (unless the material is compost and you have a specific agreement to exceed this period from the Environment Agency). Materials that are at risk of self combustion if stored for more than 3 months are:

- green material, compost, wood and wood products, paper and paper products, general waste including RDF and 'fines'
- tyres (whole or processed)
- smaller size or graded materials either stored or mixed
- material that has not had potential hazards removed before stacking eg exposed rust (which can generate heat)
- treated materials which aren't cold before storage (treatment processes can generate heat)

If you are storing materials at risk of self combustion for longer than 3 months you must demonstrate what additional measures you will take, including monitoring and turning of the piles.

You can prevent self combustion if you focus on separation, isolation, restricting storage times and keeping materials cold. You must demonstrate a clear method to record and manage the storage of all waste on site and ensure you have robust waste acceptance procedures to prevent receipt of unauthorised waste.

You must:

- reduce risk factors (eg exposed metal content, proportion of 'fines', mixing of materials and heat generated during treatment)
- minimise pile sizes (small piles with appropriate separation are safer than one big one)
- control moisture levels
- demonstrate good stock rotation for all stored materials and show how this is monitored and implemented daily
- store material in its largest form prior to processing
- monitor and control sub-surface temperature and moisture content with a thermal probe or other device and ensure that this is capable of reaching all parts of a pile (if materials are stored in plastic wrapping you must demonstrate a sampling and testing protocol to ensure a representative number of bales (minimum 10%) are assessed during monitoring)
- routinely turn piles
- detect and control hotspots within piles
- define the maximum storage time of all materials on site and show how this will be monitored and controlled
- minimise external heating during hot weather by shading from direct sunlight

## Detecting and suppressing fires

If a fire starts, the quicker it is detected and tackled the better.

You must:

- provide portable extinguishers
- carry out regular inspections, including at the start and end of every working day

You should consider fitting:

- automatic detection systems such as:
  - smoke and heat detectors including temperature probes
  - CCTV visual flame detection systems

- spark, infrared and ultraviolet detection

and

- fire suppression systems such as:
  - sprinklers
  - water spray (deluge) systems
  - water curtains

Materials stored in a building will require a fire suppression system. Materials must be kept a minimum of 3m below the level of the spray or sprinklers.

These systems will usually keep a fire under control and may extinguish the fire quickly and safely. This will mean less damage to your site, the local community and the environment. The system(s) you choose will depend on your site's risks. For example some fire suppression systems may not be effective at tackling a deep seated fire.

If you store processed materials to the maximum capacity outlined in this guidance it is likely that a deep seated fire could occur. You must install a system that detects fire quickly and restricts fire spread, eg water curtains.

On the largest sites (and especially on sites where reprocessing or power generation takes place) you should consider providing a private fire hydrant system with the necessary supply of water.

## Containing and mitigating fires

You must:

- have all appropriate measures in place that limit the size, duration and impact of a fire
- have a designated quarantine area available at all times with a 10m clear area around the perimeter to aid separation and management of wastes during an incident
- appropriately locate all piles, clearly indicating them on your site plan
- ensure piles are appropriately sized and separated
- appropriately store materials within buildings and maintain separation distances from flammable or combustible materials on site (eg gas cylinders, aerosols and fuel tanks)
- apply appropriate separation distances from the pile(s) to a site boundary or road
- ensure quantities and pile sizes are kept to a minimum, and throughput is maximised to keep pile sizes below the recommended sizes
- include a fire fighting strategy within the fire prevention plan
- install secondary and tertiary containment facilities for firewater run-off such as:
  - impermeable bunds
  - storage lagoons
  - shut-off valves
  - isolation tanks
  - modified areas of your site eg a car park
  - pollution control equipment such as firewater booms and drain mats to block drains and/or divert firewater

If you use fire walls between piles they must be of sufficient height, thickness and construction to stop fire spreading and minimise radiant heat.

You can put combustible materials in shipping containers. These should be stacked no more than 2 containers high and secured with a lock.

## Managing waste piles

You must:

- manage all piles to within the maximum sizes and minimum separation distances given in table 1
- have adequate water supplies available at all times to fight a fire
- enable easy access for emergency vehicles around the whole site
- manage all piles of materials that can self-combust and demonstrate suitable additional precautions if they are stored for more than 3 months

## Piles and separation distances

The height must be taken as the longest measurement between the base of the pile and the top. If the ground is uneven this may not be the highest point.

Treat 2 or more piles as 1 pile if:

- they are within an area not exceeding 235m<sup>2</sup> and the longest dimension doesn't exceed 20m
- the space between them doesn't meet the minimum separation distances in table 1

Table 1: Maximum pile sizes and minimum separation distance

Material	Max height (m)	Length/width (m)	Max vol (m <sup>3</sup> )	Max area (m <sup>2</sup> )	Min separation (m)
Paper, cardboard and rags	5	20	750	235	6
Plastic rubber and other materials	5	20	450	235	6
Fridges, computers and electrical equipment	5	20	300	235	15
Processed wood including sawdust, shavings, chips	3	10	150	100	6
RDF and fragmentiser fluff	5	20	450	235	6
Unprocessed wood	5	20	750	235	6

For groups of 16 piles or more you must apply a spacing of 20m between the groups.

Piles with a mixture of combustible materials must take account of the proportion of the materials, the form the materials are stored in and the likely characteristics of any fire involving it.

## Enclosing piles using bays and walls

If you use bays or walls then you must demonstrate:

- full and frequent stock rotation and how this will be monitored and recorded
- protection from wind
- how you intend to check temperature and moisture content of all the material within the bay so that the entire volume of the pile receives representative checks

- the construction of the walls in terms of how they offer a thermal barrier and enable cooling
- how stock capacity will be managed and controlled
- how you will ensure segregation of materials
- how calculation of flame height and radiation has been taken into account in preventing the spread of fire between piles
- prevention of brands or lighted material moving outside the bay walls
- prevention of bridging across or around walls
- how a 'freeboard' space at the top and sides of the walls will be physically retained at all times in accordance with the latest available guidance
- the frequency and method of turning piles
- how the quarantine area will be used and how materials will be moved during an incident

## Turning and monitoring of piles

Piles must be turned regularly to ensure that the material remains cold and any localised warming is dissipated quickly. Your staff must be trained to detect and manage hotspots. How you achieve this must be included in your fire prevention plan.

Current guidance must be followed so that piles are monitored regularly and temperature increases and changes in moisture content are minimised. The equipment you use to detect temperature and moisture content must be capable of operating at any depth throughout the pile. Therefore, if you are proposing to have a pile 5m deep, your probe must be capable of operating to 5m.

You must explain what triggers you will use in relation to temperature and moisture content and the escalation of actions in relation to these triggers.

## Layout of piles on your site

When you have identified the separation distances required between piles, and the location of heat sources, buildings, and other vulnerable areas on site, you can plan the storage arrangements. You should also consider the prevailing wind, where fire water will flow and the fire fighting strategy that will be used. An example is shown in figure 1.

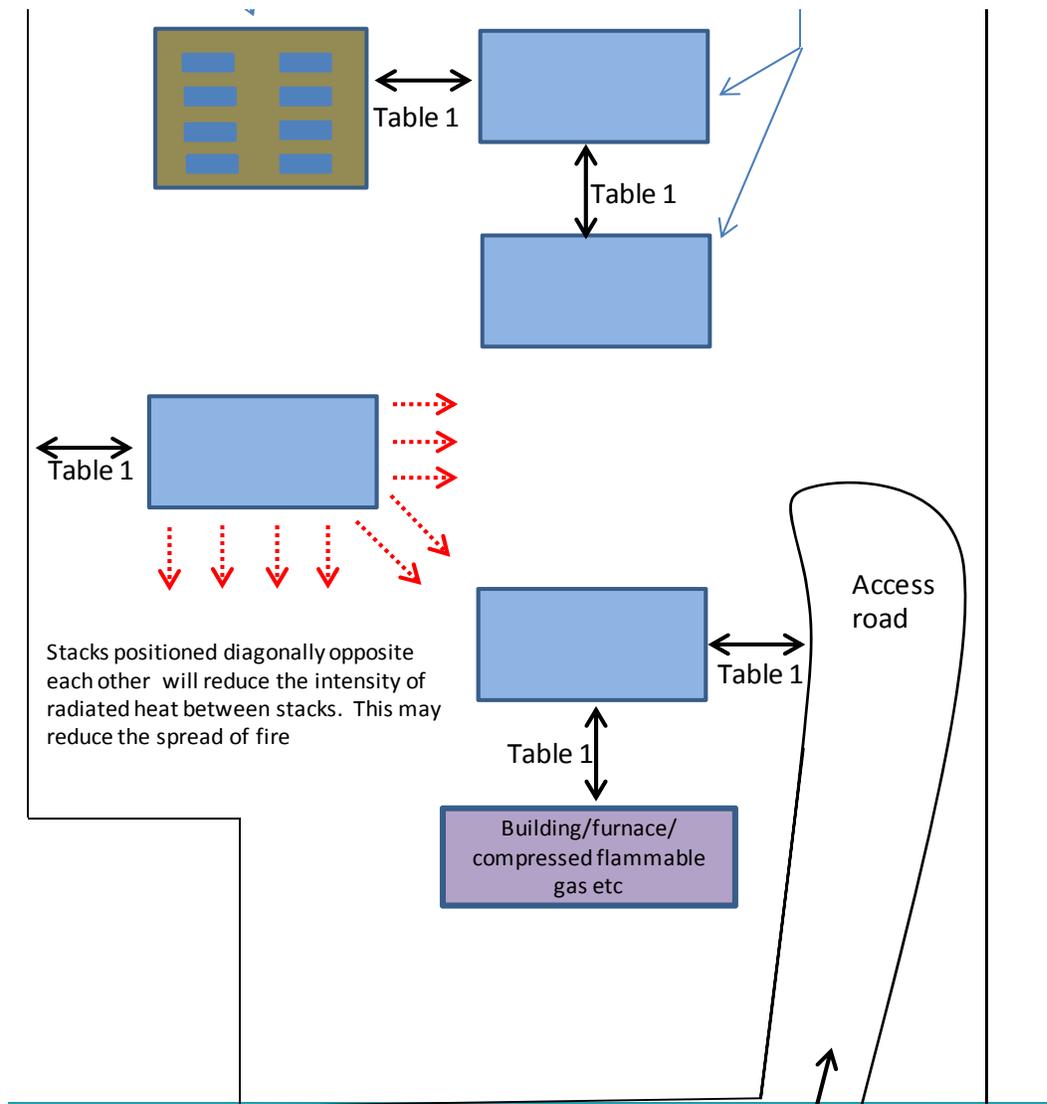


Figure 1: example of good pile layout

## Seasonality and pile management

You must prove that your pile management is viable. You must also prove the suitability of materials and the resilience of the supply chain and end user outlets. Provide a technical assessment that shows you have confidence that your proposal will be viable in foreseeable market conditions.

If the materials on your site are subject to seasonal variation in demand and/or supply you must demonstrate how you intend to manage these variations.

All these issues and the contingencies you employ to minimise them must be in your management system and implemented before operations commence on site.

## Managing fire water

The containment facilities and pollution equipment you need will depend on the size of your site, the amount of material you store and the fire fighting strategy. The CIRIA document '[Containment systems for the prevention of pollution \(C736\)](#)' may help you identify the facilities and equipment you need for your site.

If you make an uncontrolled discharge to the water environment you may be committing an offence unless:

- you have a permit to do so
- the discharge meets the conditions of that permit

## Water supplies

You must have sufficient water supplies available on your site to manage a worst case scenario incident (eg all piles on site are on fire).

Use this estimate to calculate the volume of water you will need:

A 300m<sup>3</sup> pile of combustible material will normally require a water supply of at least 2,000 litres a minute for a minimum of 3 hours.

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