

Risk Control

Fire safety in agricultural and horticultural premises



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SCOPE

These recommendations apply to farms, agricultural and horticultural undertakings, but do not relate to those parts of the premises which may form retail outlets, such as farm shops and garden centres. Boot sales, markets, fetes, hunting, sports days, camping sites, holiday accommodation and recreational activities carried out on farmland are also outside the scope of these recommendations.

The advice should be read in conjunction with other in-depth advice on specific fire hazards and should be taken into consideration when risk assessments are carried out in compliance with the Regulatory Reform (Fire Safety) Order 2005 and equivalent legislation in Scotland and Northern Ireland (refs. 1 to 4) and the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) (ref. 5).

Throughout this document the term 'agricultural premises' has been used for brevity and all such references also apply to horticultural premises.

SYNOPSIS

These recommendations aim to raise awareness of the problem of fires in farm and other agricultural and horticultural premises.

Practical advice is presented to protect staff and visitors to the premises, the animals, buildings, stored materials and crops. Specific advice is presented regarding grain silos, haystacks and the storage of flammable liquids, herbicides and other agricultural chemicals.

Advice is also presented to help reduce the incidence of deliberate fire setting on farm property and elsewhere in the countryside.

DEFINITIONS

Arson

This term is used in a generic manner in this document to refer to all forms of deliberate fire raising, including wilful or 'culpable and reckless' fire raising in Scotland.

INTRODUCTION

Every year in the UK some 1,700 farm buildings and 66,000 acres of grassland are destroyed by fire. Animals are killed or injured and there is a significant threat to the continued operations of the business, as well as to life safety and the protection of the farm buildings and related property. A serious fire on a farm can affect the financial stability of even the most well-run business.

Accidental fires may result from electrical equipment, smoking, or the various processes carried out on the crops. The number of visitors to the farm may also give rise to hazardous events such as barbecues and discarded bottles which could later focus the sun's rays to cause a fire.

About half of fires on agricultural property are started deliberately, as an act of vandalism. The isolated location of many farms makes them particularly vulnerable to arson. The ready availability of easily ignitable material is a significant hazard in this respect.

RECOMMENDATIONS

1. Fire safety management

1.1 *Complying with fire safety legislation*

1.1.1 The fire safety management strategy for a farm should, like in all other commercial enterprises, consider practical passive, active and managerial control measures as part of the fire risk assessment for the premises undertaken in compliance with the Regulatory Reform (Fire Safety) Order 2005 (or equivalent legislation in Scotland and Northern Ireland) (refs. 1 to 4). The measures should include:

- the provision of suitable means of escape to a place of safety away from the fire;
- suitable fire detection and warning systems in case of fire;
- passive fire protection measures, including appropriate compartmentation of large structures where necessary, together with the separation of buildings and plant;
- portable firefighting equipment and automatic fire protection measures;
- the production of fire action notices to inform staff of the actions to be taken if a fire is discovered or the fire alarm sounds; and
- staff training in the actions to take in the event of fire, including evacuation of any members of the public and other visitors to the site, and the welfare of livestock. Care should be taken in the case of workers whose first language is not English that the training has been fully understood.

While carrying out the fire risk assessment it is also beneficial to consider measures for property protection and business continuity. Thus, the following should also be considered at this time:

- developing an emergency plan to protect property and ensure the continued functioning of the business in the case of fire;
- undertaking a separate risk assessment for the evacuation and handling of animals in an emergency, this should include identifying safe routes and holding areas for livestock; and
- ensuring awareness of areas where smoking is prohibited. Where the public and visitors may be present, signs prohibiting smoking may be necessary.

1.1.2 An assessment in compliance with DSEAR (ref. 5) should also be undertaken where refrigerated stores and hazardous materials (such as significant quantities of flammable liquids, gas cylinders and agricultural chemicals) are present on the site. An assessment under DSEAR is also required where there may be dusty environments, such as where grain drying processes are undertaken.

1.2 *Liaison with the fire and rescue service*

1.2.1 Periodic liaison should be maintained with the fire and rescue service. It is important to consider in the emergency plan the time that may elapse before their arrival and the availability of further pumps in the case of a major incident.

1.2.2 Discussions should also address the availability of water supplies, especially during long, hot summer months.

- 1.2.3 Suitable access must be given to the vicinity of agricultural buildings, silos and other high fire hazard areas for fire and rescue service personnel and their equipment. Liaison should be established with the fire and rescue service in relation to the width, headroom, turning circles and provision of hard standing for their vehicles
- 1.2.4 The service should be informed about the location, nature and quantities of hazardous materials stored and used on site. It is helpful to provide a secure box near the entrance containing plans of the site, showing the layout, location and quantities of hazardous substances (such as highly flammable liquids, compressed gas cylinders, tanks, refrigerants and agrochemicals) together with the location of hydrants and other water supplies.
- 1.2.5 In the event of a fire, a designated member of staff should be available to meet the fire and rescue service and inform the officer in charge of:
- the location of the fire;
 - the situation regarding personnel and livestock;
 - the location of water supplies for firefighting; and
 - the nature, location and approximate quantities of hazardous materials on the site, including fuel tanks, gas cylinders, biohazards and agrochemicals.

1.3 Hot works

Hot works include welding, cutting and other works involving the use of blow torches. It also includes the use of grinding and similar equipment where sparks may be produced.

- 1.3.1 A policy should be in place to eliminate the need for hot work wherever possible.
- 1.3.2 Where hot work is unavoidable, especially where it has to be undertaken in farm buildings or in the vicinity of crops or stored combustible materials, it should be subject to a hot work permit system as outlined in RC7: **Hot work** (ref. 6).
- 1.3.3 Where a farrier routinely visits the premises, a fixed location should be provided for the farrier to work. This is best in the open air near the stables. If it is necessary for the farrier to work under cover, the building should be non-combustible and clear of all combustible waste materials. Appropriate fire extinguishing equipment should be immediately available.

1.4 Electrical installations

The use, and misuse, of electricity in agricultural and horticultural premises is a common cause of fire. The main causes are:

- overheating cables and equipment caused by, for example, overloading;
- incorrect installation or use of equipment;
- lack of maintenance or testing;
- damaged or inadequate insulation on cables or wiring;
- damage caused by animals chewing the insulation on electrical wiring;
- combustible materials being placed too close to electrical equipment, which may produce heat when operating normally or become hot because of a fault; and
- arcing and sparking of electrical equipment.

- 1.4.1 All new fixed electrical wiring and electrical equipment, including that in animal accommodation, should be installed and inspected by a competent electrician in accordance with the current edition of BS 7671: **Requirements for electrical installations. IEE Wiring Regulations. Seventeenth edition** (ref. 7). The Periodic Inspection Report from Appendix 6 of BS 7671 should be used and accompanied by a Schedule of Inspections and Schedule of Test Results. Future inspections should be carried out as recommended in the Periodic Inspection Report.

- 1.4.2 The design of the installation should take into account areas where the environment may be wet or corrosive. In these instances, the circuitry should be suitably specified or protected and sockets that are suitably protected from the weather should be installed where necessary. This is particularly important in facilities like cowsheds, where, because of the corrosive atmosphere, the installed electric wiring, as well as portable electrical appliances, should be inspected more frequently than otherwise would be the case.

Electric motors for use in farm equipment should have a rating of at least IP55 (resistant to dust and hosed water) as defined in EN 60529: **Specification for degrees of protection provided by enclosures** (ref. 8) but should still be covered or suitably protected if used outdoors.

- 1.4.3 A suitable number of electrical socket outlets should be provided in farm buildings to reduce the use of extension leads and adaptors to a minimum.
- 1.4.4 Cables should be run in steel rather than plastic conduit for added protection from impact and animals.
- 1.4.5 Residual current devices (RCDs) should be installed on all power circuits, especially those that may be used to power portable electrical equipment outdoors. The RCDs should have a residual operating current not exceeding 30mA and should be incorporated into the distribution boards or consumer units. 'Plug-in' RCDs should be avoided wherever possible.
- 1.4.6 The equipment selected for installation should take into account the findings of the DSEAR assessment, which should identify hazard zones where there may be potential for explosible quantities of flammable liquid vapours or dusts to accumulate (ref. 5).
- 1.4.7 Any damaged electrical equipment should be turned off, unplugged and suitably labelled until it is repaired or replaced.
- 1.4.8 As portable electrical farm equipment is often subject to impact damage and environmental exposure, it should be inspected periodically (PAT tested) at least in accordance with HS(G)107: **Maintaining portable and transportable electrical equipment** (ref. 9) and may need to be tested more often as determined by a risk assessment.
- 1.4.9 Where the risk assessment indicates that a hazard from static electricity could develop in any farm process, appropriate earthing and bonding of the equipment and any extraneous metal parts should be introduced and regular inspections be undertaken and recorded.

1.5 Smoking

- 1.5.1 Smoking must be prohibited in all enclosed workplaces in accordance with no-smoking legislation in the UK (refs. 10-15) and should also be prohibited in the vicinity of crops, stored hay, straw and fuel and other areas where flammable and combustible materials are present. Further advice is set out in RC51: **Recommendations regarding smoking at work** (ref. 16).
- 1.5.2 Smoking should also be prohibited in stock yards where there is combustible animal bedding or litter on the ground.
- 1.5.3 The no-smoking policy should be emphasised during the induction training for new and temporary staff. The areas where smoking is prohibited should be clearly explained and any designated areas where smoking is allowed should also be indicated.
- 1.5.4 Suitable no-smoking signs should be displayed prominently in the immediate vicinity of high fire risk areas, such as LPG and flammable liquid stores and also elsewhere on the farm where smoking is prohibited (see paragraph 1.5.1).

1.6 Protection from deliberate fire raising

- 1.6.1 Staff should maintain an awareness regarding the opportunities for deliberate fire raising on farms and the threat that this presents to life, property and the continuing smooth running of business operations. Further advice is set out in RC48: **Recommendations for the protection of premises against deliberate fire raising** (ref. 17).

2. Business continuity

Items of plant and equipment are increasingly expensive, resulting in a small fire having the potential to have a disproportionate effect on the continued smooth running of business operations.

- 2.1 All agricultural premises should take steps to ensure the continued smooth running of their business by making suitable emergency plans.
- 2.2 The emergency plan should address the welfare of the livestock, as well as the staff, in the event of a fire. It should indicate the lines of communication that should be followed and the contact details for specialist assistance, and providers of alternative accommodation.
- 2.3 Suitable documentation should be produced to ensure the future of the business in the event of a fire, flood or similar eventuality. Consideration may be given to applying the free-to-download **Robust** software (**Resilient Business Software Toolkit**) (ref. 18), or other appropriate software, to check the adequacy of the plan.

3. Farm buildings

1.1 Complying with fire safety legislation

- 3.1 Wherever possible, buildings and structures should be designed according to the requirements of **Approved Document B: Fire Safety (volume 2) – Buildings other than dwellinghouses, incorporating insurers' requirements for property protection** (ref. 19). They should also address the requirements of the various parts of BS 5502: **Buildings and structures for agriculture** (ref. 20).

- 3.2 The materials of which agricultural buildings are constructed and their siting in relation to one another are critical in respect of the development of a fire; the fire risk assessment should consider these issues. This is particularly important to enable new agricultural buildings to be sited sufficiently distant from each other and from other buildings to prevent the spread of fire from one building to another. This factor should also be borne in mind when planning extensions to existing structures. The fire risk assessment should also address the distance between buildings and public footpaths.

- 3.3 Particular consideration should be given to the form of construction and materials used for roofs, walls and internal surfaces in order to limit the spread of flame and increase the fire resistance of the structure.

- 3.4 In some cases, combustible sprayed polyurethane insulation has been applied in temperature controlled vegetable stores and similar buildings. This renders the surfaces very vulnerable to ignition and fire spread. Non-combustible alternatives should always be used. Reference should be made to the insurers where existing sprayed polyurethane insulation is found or suspected to be present.

- 3.5 Farm produce, materials and equipment that present a high fire risk should preferably be stored in purpose-built, fire-separated buildings or enclosures. This is particularly important in respect of:

- the storage of oil and other flammable liquids;
- buildings used for the manufacture of biodiesel or biogas;
- LPG and other compressed gas cylinders;
- agrochemicals (pesticides, herbicides and chemical fertilisers);
- mechanical crop drying;
- feed grinding;
- furnace or boiler rooms;
- farm machinery and vehicle garaging; and
- maintenance workshops.

- 3.6 In cases where it is necessary for a single building to be put to multiple use, compartmentation by means of fire-resistant walls to the full height of the enclosure together with suitable fire-resistant doors to provide a degree of fire resistance appropriate to the uses to which the adjoining areas will be put should be considered to:

- sub-divide large areas;
- separate bulk storage areas and livestock; and
- segregate areas of high fire risk.

- 3.7 Careful consideration should be given to areas where air bricks and similar provisions provide cross ventilation to ensure that these do not lead to the spread of smoke and hot gases to other parts of the premises.

- 3.8 Care should be taken to ensure that combustible material is not placed near electric lights, heaters or equipment that may produce heat when operating.

- 3.9 Where stock rearing employs artificial heating, the operation should be housed in a detached, purpose-built building of non-combustible construction.

4. Heating and lighting

The following paragraphs apply in respect of all forms of farm, agricultural and horticultural premises. Further advice regarding electric lighting is available in RC37: **Recommendations for the control of fire hazards from electrical lighting in commercial and industrial premises** (ref. 21).

- 4.1 The fire risk assessment undertaken for the premises should consider the number, type, height above floor level and protection of the heaters provided in the context of the type of building, nature of the construction and the types and form of materials stored or in use there, including animal feed and bedding.
- 4.2 Fixed heaters used in all agricultural accommodation, including animal houses, should be purpose made and be installed and maintained by competent engineers.
- 4.3 Gas fuelled heaters should not be located in positions where they may be subject to a draught.
- 4.4 Space heaters should not be used with fuel other than that for which they are specifically designed without reference to the manufacturers or suppliers of the equipment. Further information relating to the installation, management and use of this form of equipment is set out in RC4: **Recommendations for fixed heaters burning waste fuel** (ref. 22).
- 4.5 Convector heaters are safer than radiant heaters but care should be taken when fitting fixed heaters to ensure that they cannot come into contact with animals or vehicles and are maintained at least 1m from animal feed, straw, hay and other combustible materials.
- 4.6 The use of portable heaters should be avoided wherever possible; heaters should be firmly fixed to walls or floors well outside the reach of livestock. Portable heaters should not be left unattended.
- 4.7 All forms of heating equipment and plant should be regularly inspected and maintained by a competent person in compliance with the manufacturer's recommendations.
- 4.8 The safest forms of heating for animal accommodation are water, low pressure steam or warm air because they are effective at comparatively low temperatures. Under floor heating is a safe, if more costly, alternative.
- 4.9 A clear space of at least 1m should be maintained around lamps used primarily for heating, unless these are an integral part of proprietary equipment designed for animal welfare.
- 4.10 In addition to any other support, infra-red lamps should be secured by chains.
- 4.11 All heaters and lights must be carefully located and well secured against animal movement.
- 4.12 All lamps should be protected to prevent the build up of dust on the hot surface of the bulb.
- 4.13 High power bulbs, such as high intensity discharge (HID) lamps and halogen bulbs over 500W, present a significant fire hazard:

- 4.13.1 Care should be taken when planning the locations of HID lamps; they should not be sited directly over combustible materials where hot particles from a broken bulb could ignite materials below.

- 4.13.2 HID lamps should also be sited well away from combustible elements of construction.

- 4.13.3 Although new lamps should be fully enclosed, the use of light fittings with integral containment barriers made of tempered, soda lime or borosilicate glass is recommended. The need for enclosures extends to shatter protected lamps, especially those where a pulse start ballast is fitted.

5. Animal accommodation

The effects of even a small fire can cause unnecessary suffering to animals, as well as posing a threat to an important farm resource and the continuity of the normal farm business. Intensive animal farming methods and the scale of economy in heating, watering and feeding the livestock often means that a very large number of animals may be housed in a single building.

- 5.1 Special consideration should be given to the fire resistance of the structure and the spread of flame of the internal surfaces, especially in the case of buildings housing livestock. The use of sprayed foam linings in particular should be avoided due to the potential for rapid fire spread and the production of copious quantities of smoke and toxic gases.
- 5.2 Escape routes for livestock should be planned to provide a direct route for the animals to open air and a place of safety away from the fire with the minimum of human intervention.
- 5.3 In buildings exceeding 30m in length there should be at least two exits located as far apart as possible, preferably at each end of the building.
- 5.4 The quantities of hay and straw stored in animal accommodation should be the minimum necessary for their immediate needs.
- 5.5 Powered equipment intended for operation in animal accommodation should be purpose made and, where necessary, installed by specialist contractors.

6. Installation and maintenance of grain dryers

The following recommendations relate to fixed installations and transportable dryers when in a static or permanent position. They also relate to dryers used for grass and seed crops such as oil seed rape, pulses, kale seed, evening primrose seed and linseed.

The application of heat to combustible material such as grain presents a significant fire hazard and a build up of dust presents an explosion hazard. It is therefore essential that a high standard of cleanliness be maintained in the equipment and buildings. The risk of fire associated with grass and grain dryers is similar to that with other machinery used for drying combustible material.

- 6.1 Because of the production of dust when drying grain and similar crops, a specific risk assessment should be carried out for the operation in compliance with DSEAR (ref. 5).
- 6.2 Crop dryers should be housed in detached, purpose-built buildings of non-combustible construction.

- 6.3 The building should be at least 20m from any other building or stack of produce.
 - 6.4 The building should not be used for any other purpose when drying is in progress unless the dryer (or the hot air furnace if separate) is separated from other areas by a wall providing at least 120-minutes' fire resistance carried up to full roof height.
 - 6.5 Any openings in the 120-minutes' fire resistant wall should be fitted with fire shutters with appropriate third party certification to demonstrate that they provide the same degree of fire resistance.
 - 6.6 Where possible, the grain dryer should be indirectly fired using a heat exchanger. But, if otherwise, adequate baffles should be provided between the furnace and the drying compartment.
 - 6.7 The dryer, hot air duct and all other ducts, platforms, elevators and conveyors should be constructed of non-combustible material.
 - 6.8 Electrical drives for the dryer, elevator and conveyor should be connected to the electrical installation in compliance with BS 7671 (ref. 7).
 - 6.9 Any exhaust or flue should be routed vertically through and above the roof or through an external wall with the hot gases being discharged at least 0.5m clear of combustible materials.
 - 6.10 Equipment burning oil should be in accordance with RC9: **Recommendations for oil-fired installations** (ref. 23).
 - 6.11 The use of temporary space heaters should be avoided in areas where grain and similar products are handled because of the potential build up of dust and other easily ignited materials.
 - 6.12 The equipment should be operated according to the manufacturers' instructions and all temperature measuring devices, thermostats and other automatic control gear should be regularly maintained and serviced by a competent person to ensure correct functioning. Where possible, temperature measuring devices should be duplicated and operate on a fail safe principle (ie shutting down the furnace to prevent overheating and subsequent ignition).
 - 6.13 Unless fitted with automatic control equipment designed to shut down the plant in the event of overheating, a dryer should not be left unattended. Where suitable automatic control equipment is installed, plant should be visited at hourly intervals.
 - 6.14 All operatives should be trained in the emergency shutdown procedures for the plant and a remote isolation switch should be provided.
 - 6.15 Where equipment polishes, in addition to drying, grain, quantities of dust may be produced and thus this equipment should be sited in open-sided or open-ended buildings to allow adequate ventilation to disperse the dust. Where necessary, dust collectors should be provided.
 - 6.16 The air inlet to the fan for the dryer should be drawn directly from the open to prevent combustible materials such as dust, chaff and straw being drawn into the furnace. This is particularly important in the case of transportable dryers.
 - 6.17 All ducts and cavities where dust, grain and other materials can accumulate should be cleaned out daily and the space around the dryer should be kept clear of dried grain and other combustible materials.
 - 6.18 The plant should be serviced annually by the manufacturer or a competent engineer before the season in which the equipment is to be operated.
 - 6.19 Transportable dryers should be operated on hard standing away from crops and combustible undergrowth. They should not be stood on tarpaulins.
- 7. Stored materials**
- 7.1 Storage of hay and silage**
- The storage of green forage crops such as grass and alfalfa in silos, forage or haylage towers, as they are variously described, has increased in recent years. The nature of the process of turning green material into cattle food requiring fermentation of the raw material, can introduce hazards unless appropriate safeguards are adopted.
- If the moisture content of the silage material is initially lower than the recommended minimum of 40% and the silage is not sufficiently compacted, the entry of oxygen due to inadequate sealing of the silo will permit vigorous heating, which will raise the temperature to a point where microbiological action stops (about 75°C) and heating continues by chemical oxidation alone. The continuing availability of oxygen will then cause a runaway condition and ignition will occur.
- Hay and straw are the materials first ignited in the majority of farm fires. These materials are easily ignitable when dry but are so widely used that the hazard may be forgotten. The storage of hay bales also presents the risk of spontaneous combustion, particularly when damp hay is stored.
- 7.1.1 Wherever possible, stored hay or straw should be in stacks of reasonable size spread well apart and located at least 20m from buildings and structures. It should also be stored away from public footpaths, roads and railways.
 - 7.1.2 Hay should not be baled or stacked until properly dry. Baled and stacked hay should be covered to keep it dry.
 - 7.1.3 Stacks of hay should be tested for overheating at regular intervals and the fire and rescue service called if the temperature rises above 70°C.
 - 7.1.4 Vigilance should be kept for rotting smells coming from hay and bales which appear lower in the middle as the hay rots away. The threat of arson also needs to be taken into account.
 - 7.1.5 Self-heating can also occur in silage; the cut of the green material in tower silos should be as uniform as possible and not exceed 20mm.
 - 7.1.6 In the case of silage, the moisture content should not be less than 40%; below this threshold the risk of fire is greatly increased.
 - 7.1.7 There should be no opening in the walls or the base of the silo that would admit air.
 - 7.1.8 During silage making, the material should be consolidated to remove air by being spread evenly. At any one period of loading, the silo should be filled to a minimum depth of 3m.

- 7.1.9 Unless loading is stopped for a very short period of time, the silo should be properly sealed to prevent air reaching the silage.
- 7.1.10 The material used for the final loading should have as high a moisture content as possible to form an effective seal or plug.
- 7.1.11 Regular checks should be kept on the temperature of the silage. Probe or recording thermometers should be used and the fire and rescue service called if an excessive temperature rise is recorded. The temperature of the top layer should be about 38°C throughout the silage making process.
- 7.1.12 Care should be taken to provide sufficient ventilation to prevent an accumulation of methane during the silage forming process, unless production of methane is sought as part of the process. In the latter case, specialist advice should be sought to enable the process to be undertaken safely and effectively.

7.2 Storage of grain and similar crops

Spontaneous combustion can occur in newly dried grain and crops such as alfalfa and oilseed rape. Movement of grain can result in significant quantities of dust accumulating in the atmosphere which represents a serious explosion hazard. The movement of the product can also lead to a build up of static electricity which is a potential ignition source.

- 7.2.1 Handling of grain, including the filling of silos and other large vessels, should be subject to a risk assessment carried out in compliance with DSEAR (ref. 5).
- 7.2.2 Prior to any further processing or storage, dried grain must be allowed to cool to ambient temperature as a precaution against spontaneous combustion. Cooling must be for a minimum of 20 minutes but a longer time may be necessary.
- 7.2.3 Grain storage immediately after drying should be within a dedicated storage facility equipped with alarm monitored temperature probes to alert attention should the core temperature rise.
- 7.2.4 Where a silo is used for storage, it should be of proprietary design and be constructed by specialist engineers. The documentation should include a service and maintenance regime.
- 7.2.5 The silo and associated extraneous metal parts should be electrically bonded and earthed to prevent a build up of static electricity. An earthing cable should be provided for bonding delivery vehicles.
- 7.2.6 All staff required to load or unload grain silos should receive suitable instruction in the hazards associated with the process and the measures they should take to minimise any outbreak of fire.
- 7.2.7 All silos should be subject to regular inspection and maintenance by a competent engineer. Such an inspection should include ensuring that the explosion relief panels are correctly fitted and free to operate. An inspection of the bonding cables should be made to ensure that they are free of corrosion, that all connections are secure and that the bonding clamp provided for the delivery vehicle is in place and the connecting surfaces are clean and free of excessive grease or corrosion.

7.3 Storage and use of herbicides, pesticides and other farm chemicals

The storage of agrochemicals needs to be carefully considered; the majority of farm chemicals are dangerous in some way. Their use tends to be seasonal, with larger amounts being stored on farms in the spring and autumn.

In all cases where herbicides, pesticides and other farm chemicals are present, an assessment should be undertaken in accordance with DSEAR (ref. 5).

Most fertilisers contain ammonium nitrate which, when involved in a fire, may enable combustible materials to continue burning even when the supply of air has been excluded. The decomposition caused by the fire produces copious volumes of toxic smoke and gases.

Pesticides are normally stored in metal or plastic drums or as a powder or granules in plastic sacks. Pesticides are seldom the cause of fires but are hazardous when heated, when toxic gases may be formed.

There are numerous environmental issues that need to be taken into account, including protecting water courses from run off water used in firefighting operations.

- 7.3.1 Agrochemicals should be stored away from other materials so that they are not exposed to fires originating in, for example, hay and straw. Dedicated storage should be provided for agrochemicals; these should be at least 20m from all buildings, structures, watercourses and wells.
- 7.3.2 The quantities of products containing significant quantities of hazardous materials, such as nitrates, stored on site should be kept to the minimum consistent with efficient farm operations.
- 7.3.3 When selecting a storage area, checks should be made as to where any firefighting water will run.
- 7.3.4 Spillages of agrochemicals and other materials in their vicinity should be cleaned up promptly to prevent contamination, such as the contamination of fertilisers by oil or diesel fuel.
- 7.3.5 An up-to-date inventory of the agrochemicals being stored and used should be maintained and made available for inspection by relevant authorities.
- 7.3.6 Warning signs appropriate to the types of materials being stored should be displayed prominently on all buildings used for the storage of agrochemicals.
- 7.3.7 Information should be provided to the fire and rescue service, as part of the continuing liaison, regarding the nature and quantities of hazardous materials stored or used on site.
- 7.3.8 Information provided by suppliers relating to the properties, storage and use of agrochemicals should be read and observed and made available for staff and fire and rescue service reference.
- 7.3.9 All staff likely to handle or use agrochemicals should receive suitable training in the hazards involved and the actions that should be taken in the event of a fire.

7.3.10 In the event of a fire involving herbicides, fertilisers and the like:

- all staff should be aware of the need to remain upwind of the smoke and toxic gases;
- if possible the building should be ventilated to minimise the production of toxic gases;
- to prevent firefighting run-off water from contaminating water courses, consideration may be given to allowing a fire to burn out under controlled conditions; and
- all spoilt fertiliser and similar products should be disposed of safely following a fire.

7.4 **Storage and use of flammable liquids**

7.4.1 Many flammable liquids, such as petrol, diesel fuel, oils, solvents and cattle dips, are in regular use on farms. Storage and use of these should be in accordance with RC20: **Recommendations for fire safety in the storage and use of highly flammable and flammable liquids, Part 1: General principles** and **Part 2: Storage in drums, cans and containers other than external fixed tanks**, and RC57: **Storage in external fixed tanks** (refs. 24-26). Where flammable and highly flammable liquids are present a risk assessment should be carried out in accordance with DSEAR (ref. 5).

7.4.2 The dispensing area around storage containers and tanks should be maintained to a high standard of cleanliness and free of potential ignition sources.

7.4.3 Wherever possible, consideration should be given to replacing flammable liquids, such as sprays and crop treatments, with suitable water-based alternatives.

7.4.4 There are now a significant number of farm premises where the production of biodiesel fuel is undertaken. Care should be taken with this process, which should be carried out in accordance with RC46: **Fire safety in the manufacture of biodiesel fuel** (ref. 27).

7.4.5 Specialist advice should be sought when other hazardous processes, such as the production of biogas from waste or biomass materials, is being undertaken.

7.5 **Storage of compressed gases**

7.5.1 Cylinders of liquefied petroleum gas (LPG) and other gases should be stored and used in accordance with RC8: **Recommendations for the storage, use and handling of common industrial gases in cylinders including LPG** (ref. 28). Where LPG is present a risk assessment should be carried out in accordance with DSEAR (ref. 5).

7.5.2 The number of cylinders of compressed flammable gases, especially acetylene, stored on the farm should be minimised. Further advice is set out in RC49: **Recommendations for reducing business interruption, Part 1: Acetylene cylinders involved in fires** (ref. 29).

8. **Crop, woodland and undergrowth fires**

8.1 **Crop fires**

Growing crops, particularly barley, are a fire hazard for a period before harvest, especially during spells of dry weather, when rapidly spreading and destructive fires can occur.

8.1.1 Ripe crops should be protected against all sources of ignition, including:

- bonfires;
- rubbish burning;
- barbecues;
- smoking materials;
- broken and discarded glass bottles that may focus the sun's rays; and
- deliberate fire raising.

8.1.2 Suitable measures should be taken to ensure that parties of school children and similar groups are adequately supervised when visiting farm premises. This will ensure the well-being of livestock as well as preventing accidents and fires.

8.1.3 In woodland where there are sustainable crops of trees, new seedlings should be planted so as to provide an adequate fire break between areas when the trees have matured. The areas of trees and width of fire breaks should be subject to a suitable fire risk assessment.

8.2 **Straw and stubble burning**

Straw and stubble burning presents a fire risk to:

- farm buildings, crops and machinery;
- the countryside – burning can damage hedgerows and trees and disturb or kill wildlife; and
- the public – smoke can cause nuisance to nearby houses and businesses and be a hazard to road traffic.

In addition, burning straw and stubble deprives the soil of valuable organic material; it also releases greenhouse gases to the atmosphere. Further information is set out in Annexes B and C.

8.2.1 Wherever possible, straw from fields should be baled and carted or be chopped and ploughed into the soil before establishing the next crop.

Legislation has been enacted relating to straw and stubble burning, an outline of what is permitted in England and Wales, Scotland and Northern Ireland is set out in Annex B.

9. **Burning waste materials**

Farms have a lot of waste to dispose of and burning is often the most practical way of getting rid of it. Waste fires, however, may get out of control and may also be spread by the wind.

9.1 The burning of waste and vegetation should be avoided unless absolutely necessary.

9.2 All waste burning must be subject to a fire risk assessment (see Annexes B and C).

9.3 Prior approval must be obtained from the Environment Agency for England and Wales, the Scottish Environment Protection Agency or the Environment and Heritage Protection Service in Northern Ireland, as appropriate.

- 9.4 Fires may only be lit on open ground that has been cleared of undergrowth and is far enough removed (typically 50m) so that there is no risk of nearby crops, storage areas, buildings, structures or neighbouring property being set alight by burning brands.
- 9.5 Large open bonfires can easily get out of control, especially in the summer when undergrowth is dry; materials must therefore only be burnt in a properly designed incinerator. The incinerator must be sited and maintained in accordance with the manufacturer's recommendations. Regular checks must be made to ensure that the spark arrestor and flue do not become clogged or corroded.
- 9.6 A permanent fire watch must be maintained by a nominated person.
- 9.7 The nominated person should have suitable fire extinguishers, beaters consisting of poles with short lengths of a thick fabric or rubber (such as old conveyor belt) attached to the ends or other equipment to hand as appropriate to fight a fire and be trained in their use.
- 9.8 Material to be burnt should be checked for dangerous items such as empty cylinders, aerosol cans and flammable substances, which should be removed and safely disposed of before it is brought to the fire.
- 9.9 Burning should not be near or beneath overhead cables (power or telegraph cables).
- 9.10 Flammable liquids should not be used to assist in the ignition of fires.
- 10. Vehicles and farm equipment**
- Common causes of tractor and machinery fires include defects in the fuel or ignition systems, improper method of refuelling, smoking and matches, over-heated engines, sparks from exhaust and friction.
- 10.1 Farm vehicles**
- 10.1.1 Major farm vehicles such as large tractors and combine harvesters represent a major investment and important farm resource. When not in use, they should therefore be garaged in a secure building, be properly maintained and kept as clean as possible to prevent a build up of dust, straw, grain and similar materials.
- 10.1.2 Farm vehicles should not be garaged in buildings used for storage, but be housed securely in a detached building kept solely for that purpose.
- 10.1.3 If a fire were to occur, it may be necessary for vehicles and machinery to be evacuated from the building and thus an emergency plan to affect this should be drawn up and rehearsed.
- 10.1.4 Access to the vehicle shed should be kept clear to allow the vehicles to be driven or towed away from the building in an emergency.
- 10.1.5 Vegetation on routes regularly used by farm vehicles should be cut short to prevent contact with vehicle exhausts.
- 10.1.6 Engines should be allowed to cool before being sheeted over.
- 10.1.7 Serious consideration should be given to installing a fixed fire suppression system in the engine bay(s) of expensive or business critical machinery.
- 10.1.8 The fuel tanks of machinery operated by petrol or diesel fuel should not be refilled while the engine is running.
- 10.1.9 Harvesters and tractors should not be refuelled close to standing crops, straw bales or similar combustible materials.
- 10.1.10 Any fuel leak should be repaired immediately.
- 10.1.11 Retrieval of fuel from farm vehicles or equipment should only be undertaken using proprietary fuel retrieval equipment in accordance with the manufacturer's instructions.
- 10.1.12 Exhausts, silencers and baffles should be checked regularly for defects and replaced as necessary.
- 10.1.13 Electrical wiring should be protected against the effects of rainwater.
- 10.1.14 Where appropriate, equipment should be bonded and earthed to prevent the build up of static electricity.
- 10.1.15 All equipment should be maintained and lubricated in accordance with the manufacturer's service schedule.
- 10.1.16 When ignited, tyres burn fiercely and produce copious volumes of thick black smoke. Spare tyres should therefore be stored in a well ventilated area away from sources of ignition. Used tyres should be stored in a similar fashion if awaiting re-use, for example to weigh down tarpaulins. Unwanted tyres should be removed from the site to eliminate the hazard.
- 10.1.17 In the case of conveyors and elevators, the tensioning of drive or conveyor belts should be checked regularly.
- 10.1.18 Combustible materials, such as loose straw and hay, should not be allowed to build up in the immediate vicinity of static equipment.
- 10.1.19 A careful watch should be kept for fires starting in grass grinders, elevators, conveyors and similar equipment as a result of frictional heat or by sparks created by stones, metal and similar foreign bodies passing through the machinery.
- 10.1.20 Water boilers should be fitted with a thermostat and a thermal cut out in case of water being lost.
- 10.1.21 Some farm machinery contains a radioactive source; this machinery should be clearly labelled. Purchase of such machinery must be notified to the HSE and the fire and rescue service should also be informed.
- 10.2 Spraying and fogging**
- Many agricultural processes involve spraying processes and fires have been caused by these operations, which include the spraying of suppressants on crops, such as potatoes, and during fumigation processes. In order to minimise the hazard:
- 10.2.1 Spraying equipment should be sited outside the area in which spraying is to be undertaken to prevent sparks, hot engines and exhausts coming into contact with straw and other combustible materials.
- 10.2.2 A length of non-combustible piping should be fitted between the spraying equipment and the items to be processed.

10.2.3 A spark guard should be fitted to the spray nozzle.

Fogging is a process whereby an active agent such as a chemical inhibitor or pesticide dissolved in methanol or a similar volatile solvent is dripped onto a hotplate in proprietary equipment to produce fog particles with a size in the order of 50µm.

Such machines are used to introduce reagents to inhibit the growth of potatoes and other vegetables, for ripening bananas and in horticultural glasshouses for dispersing pesticides. Their use introduces a fire and explosion hazard into the workplace.

10.2.4 Before commencing fogging, a suitable and sufficient fire risk assessment should be undertaken, with special note being taken to eliminate any potential ignition hazards in the intended area of use.

10.2.5 As with all other specialist equipment, the manufacturer's instructions and maintenance requirements should be observed.

10.2.6 The equipment should not be used other than for its designed purpose.

11. Fire protection

11.1 Fire detection and alarm systems

11.1.1 A fire warning system should be provided where operations are carried out inside buildings. The type of system needed should be determined from the fire risk assessment. In some very small buildings where there are few people at work, it may be acceptable to shout 'Fire!' or use a bell, klaxon or siren. But in most structures a manual or automatic fire detection system designed, installed and maintained by an engineer with accreditation by an independent, UKAS-accredited third party certification body and complying with a recognised category of installation as defined in BS 5839-1: 2002 + A2: 2008: **Fire detection and fire alarm systems for buildings. Code of practice for system design, installation, commissioning and maintenance** (ref. 32) should be provided.

11.1.2 Where indicated by the fire risk assessment, serious consideration should be given to the installation of an automatic fire detection and alarm installation, especially in buildings where there has been significant investment in vehicles, plant or livestock.

11.1.3 The fire alarm should sound in the structure in which the fire is detected (either manually or automatically) and in the area immediately outside so as to summon assistance, especially where animals have to be evacuated. Care should be taken to select fire alarm sounders and position them such that, while remaining effective in alerting staff, they do not disturb, excite or agitate the livestock. In some instances, consideration may be given to installing beacons to provide a visual warning.

11.1.4 A regular cleaning regime should be put in place as part of the routine maintenance of automatic fire detectors. Where detector heads are located in a dusty environment frequent cleaning may be required in order to reduce the likelihood of false alarms and ensure that the heads remain in working order.

11.1.5 In large operations, consideration should be given to linking the control panels of separate installations to a central point, such as the farm office, and to a commercial alarm receiving centre, which can alert the fire and rescue service without delay, especially in the event of a fire at night.

11.2 Firefighting provisions

The requirements for portable firefighting equipment will depend on the quantities of combustible and flammable materials present in the facility and the ignition hazards present.

11.2.1 All agricultural buildings should be provided with a suitable number of appropriate portable fire extinguishers, approved and certificated by an independent, third-party certification body, in accordance with BS 5306-8 (ref. 33).

11.2.2 Portable firefighting equipment may also be required in other external areas and be carried on farm vehicles. Where fire extinguishers are exposed to the environment they should be protected by proprietary cabinets or coverings.

11.2.3 Where extinguishers are provided in unheated buildings, in external areas or on vehicles a suitable anti-freeze agent should be added to the contents of water-based extinguishers by the service engineer at the time of the annual servicing of the equipment.

11.2.4 All fire extinguishers should be serviced at least annually by a competent engineer in compliance with BS 5306-3 (ref. 34) and more frequently where determined by the fire risk assessment.

11.2.5 Any extinguisher that has been damaged or partially used should be replaced without delay.

The installation of automatic firefighting systems, such as an automatic sprinkler installation, will not only reduce the effects of fire damage to buildings and their contents but may increase the time available to save valuable livestock on which many farmers' livelihoods depend.

11.2.6 Sprinkler installations should comply with the **LPC Rules for Sprinkler Installations incorporating BS EN 12845** (ref. 35); they should be designed, installed and maintained by an engineer with accreditation by an independent, UKAS-accredited third party certification body.

11.2.7 Only dry or pre-action sprinkler systems should be installed in unheated buildings.

11.2.8 Sprinkler systems should not be used for protecting grain stores.

11.2.9 The fire and rescue service and an appropriate specialist should be consulted regarding the provision of water for firefighting purposes and water supplies for sprinkler systems respectively. The locations of nearby ponds, canals and watercourses should be made known to the fire service and, where natural water sources are not available, serious consideration should be given to consulting with them regarding the installation of a water tank.

11.2.10 The fire and rescue service should have unobstructed access to hydrants and other water supplies relevant to the site.

11.2.11 Where the provision of other forms of portable firefighting equipment is not viable, such as in woods and on heathland, fire points should be set up and be conspicuously signed. These points should have notices indicating how the fire and rescue service should be called in the event of fire and a warning not to attempt to fight a fire if the flames are approaching rapidly or there is a significant wind. A number of beaters should be provided at these fire points for use in beating out a slow burning fire in undergrowth.

12. Lightning protection

A properly installed lightning protection system demonstrates good risk management for many farm buildings; installations should comply with BS EN 62305: **Protection against lightning** (ref. 36). Buildings close to trees, on brows of hills and those with metal roofs should be given special consideration. Further advice on lightning protection is set out in RC35: **Protection of buildings against lightning strike** (ref. 37).

12.1 Lightning protection systems must be maintained periodically, normally annually, to assure maximum protection and safety. Further details are set out in RC35.

13. Security against deliberate fire raising

The isolated location of many agricultural and horticultural businesses, their open boundaries and readily ignitable hay, straw and crops make them an easy target for fire setters. At the same time, 'right to roam' legislation encourages strangers into the vicinity of farm premises. While arson attacks on farms and smallholdings may be difficult to eliminate, a number of simple precautions can substantially reduce the risk of attack. Further advice is available in RC48: **The protection of premises from deliberate fire raising** (ref. 38).

13.1 Farms are particularly vulnerable to arson and the consideration of this should form a major part of the fire risk assessment undertaken for the site under the Regulatory Reform (Fire Safety) Order 2005 (ref. 1).

13.2 The security of farm premises against fires caused by vandalism, arson and careless members of the public should be taken into account when planning the location and design of new property.

13.3 If buildings have to be near roads, public footpaths, playing fields or other areas to which large numbers of members of the public have access, they should not be open-sided or have easy access from the affected sides.

13.4 Buildings should be secure against unauthorised entry without adversely affecting means of escape in case of fire. The means of escape from all farm buildings should be subject to the fire risk assessment undertaken in compliance with the Regulatory Reform (Fire Safety) Order 2005 (ref. 1). Hardware, such as push bars, should be fitted to final exits to allow them to remain secure from the outside while allowing easy and immediate exit from the building from within without the use of a key.

13.5 Fences and gates surrounding buildings, as well as those protecting livestock, should be kept in good repair.

14. Checklist

14. Checklist		Yes	No	N/A	Action required	Due date	Sign on completion
14.1	Fire safety management (section 1)						
14.1.1	Has a fire risk assessment for the premises been undertaken in compliance with the Regulatory Reform (Fire Safety) Order 2005 (or equivalent legislation in Scotland and Northern Ireland)? (1.1.1)						
14.1.2	Has an assessment in compliance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) been undertaken where refrigerated stores, hazardous materials, flammable liquids, gas cylinders or agricultural chemicals are present on the site or where volumes of dust are produced? (1.1.2)						
14.1.3	Is periodic liaison maintained with the fire and rescue service? (1.2.1)						
14.1.4	Do discussions with the fire and rescue service address the availability of water supplies, especially during long, hot summer months? (1.2.2)						
14.1.5	Is there suitable access to the vicinity of agricultural buildings, silos and other high fire hazard areas for fire and rescue service personnel and their equipment? (1.2.3)						
14.1.6	Is the fire and rescue service informed about the location, nature and quantities of hazardous materials stored and used on site? (1.2.4)						
14.1.7	In the event of a fire, is a designated member of staff made available to meet the fire and rescue service and inform the officer in charge of the location of the fire, the situation regarding personnel and livestock, and the locations of water supplies and hazardous materials? (1.2.5)						
14.1.8	Is a policy in place to eliminate the need for hot work wherever possible? (1.3.1)						
14.1.9	Where hot work is unavoidable, is it subject to a hot work permit system? (1.3.2)						
14.1.10	Where a farrier routinely visits the premises, is a fixed location provided for the farrier to work? (1.3.3)						
14.1.11	Is all new fixed electrical wiring and electrical equipment installed and inspected by a competent electrician in accordance with the current edition of BS 7671? (1.4.1)						
14.1.12	Does the design of the installation take into account areas where the environment may be wet or corrosive? (1.4.2)						
14.1.13	Is there a suitable number of electrical socket outlets provided in the farm buildings to reduce the use of extension leads and adaptors to a minimum? (1.4.3)						
14.2.14	Are cables run in steel rather than plastic conduit for added protection from impact and animals? (1.4.4)						
14.1.15	Are residual current devices (RCDs) installed on all power circuits, especially those which may be used to power portable electrical equipment outdoors? (1.4.5)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.1.16	Does the selection of equipment for installation take into account the findings of the DSEAR assessment, which should identify hazard zones (where there may be potential for explosible quantities of flammable liquid vapours or dusts to accumulate)? (1.4.6)						
14.1.17	Is any damaged electrical equipment turned off, unplugged and suitably labelled until it is repaired or replaced? (1.4.7)						
14.1.18	Is portable electrical farm equipment inspected periodically (PAT tested) at least in accordance with HS(G)107? (1.4.8)						
14.1.19	Where the risk assessment indicates that a hazard from static electricity could develop in any farm process, has appropriate earthing and bonding of the equipment and any extraneous metal parts been introduced and regular inspections undertaken and recorded? (1.4.9)						
14.1.20	Is smoking prohibited in all enclosed workplaces in accordance with no-smoking legislation in the UK and also in the vicinity of crops, stored hay, straw and fuel and other areas where flammable and combustible materials are present? (1.5.1)						
14.1.21	Is smoking also prohibited in stock yards where there is combustible animal bedding or litter on the ground? (1.5.2)						
14.1.22	Is the no-smoking policy emphasised during the induction training for new and temporary staff? (1.5.3)						
14.1.23	Are suitable no-smoking signs displayed prominently in the immediate vicinity of high fire risk areas such as LPG and flammable liquid stores and elsewhere on the farm where smoking is prohibited? (1.5.4)						
14.1.24	Do staff maintain an awareness regarding the opportunities for deliberate fire raising on farms and the threat that this presents to life, property and the continuing smooth running of business operations? (1.6.1)						
14.2	Business continuity (section 2)						
14.2.1	Are all steps taken to ensure the continued smooth running of the business by making suitable emergency plans? (2.1)						
14.2.2	Does the emergency plan address the welfare of the livestock, as well as the staff, in the event of a fire? (2.2)						
14.2.3	Has suitable documentation been produced to ensure the future of the business in the event of a fire, flood or similar eventuality? (2.3)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.3	Farm buildings (section 3)						
14.3.1	Wherever possible, are buildings and structures designed according to the requirements of Approved Document B to the Building Regulations 2000 incorporating insurers' requirements for property protection? (3.1)						
14.3.2	Does the fire risk assessment consider the materials of which agricultural buildings are constructed and their siting in relation to one another in respect of the development of a fire? (3.2)						
14.3.3	Is particular consideration given to the form of construction and materials used for roofs, walls and internal surfaces in order to limit the spread of flame and increase the fire resistance of the structure? (3.3)						
14.3.4	Is a non-combustible alternative used in place of spraying combustible polyurethane insulation in temperature controlled vegetable stores and similar buildings? (3.4)						
14.3.5	Are farm produce, materials and equipment that present a high fire risk stored in purpose built, fire-separated buildings or enclosures? (3.5)						
14.3.6	In cases where it is necessary for a single building to be put to multiple use, is compartmentation by means of fire-resistant walls to the full height of the enclosure together with suitable fire-resistant doors providing an appropriate degree of fire resistance put in place to sub-divide large areas, separate bulk storage areas and livestock and segregate areas of high fire risk? (3.6)						
14.3.7	Is careful consideration given to areas where air bricks and similar provisions provide cross ventilation to ensure that these do not lead to the spread of smoke and hot gases to other parts of the premises? (3.7)						
14.3.8	Is care taken to ensure that combustible material is not placed near electric lights, heaters or equipment that may produce heat when operating? (3.8)						
14.3.9	Where stock rearing employs artificial heating, is the operation housed in a detached, purposed built building of non-combustible construction? (3.9)						
14.4	Heating and lighting (section 4)						
14.4.1	Does the fire risk assessment undertaken for the premises consider the number, type, height above floor level and protection of the heaters provided in the context of the type of building, nature of the construction and the types and form of materials stored or in use there, including animal feed and bedding? (4.1)						
14.4.2	Are the fixed heaters used in all agricultural accommodation, including animal houses, purpose made and installed and maintained by competent engineers? (4.2)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.4.3	Are gas fuelled heaters located in positions where they will not be subject to a draught? (4.3)						
14.4.4	Are measures taken to avoid space heaters being used with fuel other than that for which they are specifically designed without reference to the manufacturers or suppliers of the equipment? (4.4)						
14.4.5	Is care taken when fitting fixed heaters to ensure that they cannot come into contact with animals or vehicles and are maintained at least 1m from animal feed, straw, hay and other combustible materials? (4.5)						
14.4.6	Is the use of portable heaters avoided wherever possible? (Heaters should be firmly fixed to walls or floors well outside the reach of livestock.) (4.6)						
14.4.7	Are all forms of heating equipment and plant regularly inspected and maintained by a competent person in compliance with the manufacturer's recommendations? (4.7)						
14.4.8	Are the safest forms of heating for animal accommodation in use? (These are water, low pressure steam or warm air because they are effective at comparatively low temperatures. Under floor heating is a safe, if more costly, alternative) (4.8)						
14.4.9	Is a clear space of at least 1m maintained around lamps used primarily for heating unless these are an integral part of proprietary equipment designed for animal welfare? (4.9)						
14.4.10	Are infra-red lamps secured by chains in addition to any other support? (4.10)						
14.4.11	Are all heaters and lights carefully located and well secured against animal movement? (4.11)						
14.4.12	Are all lamps protected to prevent the build up of dust on the hot surface of the bulb? (4.12)						
14.4.13	Is care taken when planning the locations of high intensity discharge lamps? (They should not be sited directly over combustible materials where hot particles from a broken bulb could ignite materials below.) (4.13.1)						
14.4.14	High intensity discharge lamps should also be sited well away from combustible elements of construction? (4.13.2)						
14.4.15	Are new lamps fully enclosed? (The use of light fittings with integral containment barriers made of tempered, soda lime or borosilicate glass is recommended.) (4.13.3)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.5	Animal accommodation (section 5)						
14.5.1	Is special consideration given to the fire resistance of the structure and the spread of flame of the internal surfaces, especially in the case of buildings housing livestock? (5.1)						
14.5.2	Are escape routes for livestock planned to provide a direct route for the animals to open air and a place of safety away from the fire with the minimum of human intervention? (5.2)						
14.5.3	In buildings exceeding 30m in length, are there at least two exits located as far apart as possible, preferably at each end of the building? (5.3)						
14.5.4	Are the quantities of hay and straw stored in animal accommodation the minimum necessary for their immediate needs? (5.4)						
14.5.5	Is powered equipment intended for operation in animal accommodation purpose made and, where necessary, installed by specialist contractors? (5.5)						
14.6	Installation and maintenance of grain dryers (section 6)						
14.6.1	Has a specific risk assessment been carried out for the operation in compliance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)? (6.1)						
14.6.2	Are crop dryers housed in detached, purpose-built buildings of non-combustible construction? (6.2)						
14.6.3	Is the building at least 20m from any other building or stack of produce? (6.3)						
14.6.4	Is the building used solely for drying grain when this process is in progress unless the dryer (or the hot air furnace if separate) is separated from other areas by a wall providing at least 120-minutes' fire resistance carried up to full roof height? (6.4)						
14.6.5	Are any openings in the 120-minutes' fire resistant wall fitted with fire shutters with appropriate third party certification to demonstrate that they provide the same degree of fire resistance? (6.5)						
14.6.6	Where possible, is the grain dryer indirectly fired using a heat exchanger? (But, if otherwise, are adequate baffles provided between the furnace and the drying compartment?) (6.6)						
14.6.7	Are the dryer, hot air duct and all other ducts, platforms, elevators and conveyors constructed of non-combustible material? (6.7)						
14.6.8	Are electrical drives for the dryer, elevator and conveyor connected to the electrical installation in compliance with BS 7671? (6.8)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.6.9	Is any exhaust or flue routed vertically through and above the roof or through an external wall with the hot gases being discharged at least 0.5m clear of combustible materials? (6.9)						
14.6.10	Is equipment burning oil in accordance with RC9: Recommendations for oil fired installations? (6.10)						
14.6.11	Is the use of temporary space heaters avoided in areas where grain and similar products are handled because of the potential build up of dust and other easily ignited materials? (6.11)						
14.6.12	Is the equipment operated according to the manufacturers' instructions and all temperature measuring devices, thermostats and other automatic control gear regularly maintained and serviced by a competent person to ensure correct functioning? (6.12)						
14.6.13	Unless fitted with automatic control equipment designed to shut down the plant in the event of overheating, is a dryer never left unattended? (Where suitable automatic control equipment is installed, is plant visited at hourly intervals?) (6.13)						
14.6.14	Are all operatives trained in the emergency shutdown procedures for the plant, and is a remote isolation switch provided? (6.14)						
14.6.15	Where equipment polishes, in addition to drying grain, is the equipment sited in open-sided or open-ended buildings to allow adequate ventilation to disperse the dust? (6.15)						
14.6.16	Is the air inlet to the fan for the dryer drawn directly from the open to prevent combustible materials such as dust, chaff and straw being drawn into the furnace? (6.16)						
14.6.17	Are all ducts and cavities where dust, grain and other materials can accumulate cleaned out daily and the space around the dryer kept clear of dried grain and other combustible materials? (6.17)						
14.6.18	Is the plant serviced annually by the manufacturer or a competent engineer before the season in which the equipment is to be operated? (6.18)						
14.6.19	Are transportable dryers operated on hard standing away from crops and combustible undergrowth? (6.19)						
14.7	Stored materials (section 7)						
14.7.1	Wherever possible, is stored hay or straw in stacks of reasonable size spread well apart and located at least 20m from buildings and structures? (It should also be stored away from public footpaths, roads and railways.) (7.1.1)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.7.2	Is hay baled or stacked when properly dry? (7.1.2)						
14.7.3	Are stacks of hay tested for overheating at regular intervals and the fire and rescue service called if the temperature rises above 70°C? (7.1.3)						
14.7.4	Is vigilance kept for rotting smells coming from hay and bales which appear lower in the middle as the hay rots away? (7.1.4)						
14.7.5	Self-heating can also occur in silage; is the cut of the green material in tower silos as uniform as possible and not exceeding 20mm? (7.1.5)						
14.7.6	In the case of silage, is the moisture content more than 40%? (7.1.6)						
14.7.7	Are the base and walls of the silo free from holes that would allow the entry of air? (7.1.7)						
14.7.8	During silage making, is the material consolidated to remove air by being spread evenly? (At any one period of loading, is the silo filled to a minimum depth of no more than 3m?) (7.1.8)						
14.7.9	Unless loading is stopped for a very short period of time, is the silo properly sealed to prevent air reaching the silage? (7.1.9)						
14.7.10	Does the material used for the final loading have as high a moisture content as possible to form an effective seal or plug? (7.1.10)						
14.7.11	Are regular checks kept on the temperature of the silage? (7.1.11)						
14.7.12	Is care taken to provide sufficient ventilation to prevent an accumulation of methane during the silage forming process? (If production of methane is sought as part of the process, specialist advice should be sought to enable the process to be undertaken safely and effectively.) (7.1.12)						
14.7.13	Is the handling of grain, including the filling of silos and other large vessels, subject to a risk assessment carried out in compliance with DSEAR? (7.2.1)						
14.7.14	Prior to any further processing or storage, is dried grain allowed to cool to ambient temperature as a precaution against spontaneous combustion? (7.2.2)						
14.7.15	Is grain storage immediately after drying within a dedicated storage facility equipped with alarm monitored temperature probes to alert attention should the core temperature rise? (7.2.3)						
14.7.16	Where a silo is used for storage is it of proprietary design and constructed by specialist engineers? (7.2.4)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.7.17	Are the silo and associated extraneous metal parts electrically bonded and earthed to prevent a build up of static electricity (with an earthing cable provided for bonding delivery vehicles)? (7.2.5)						
14.7.18	Do all staff required to load or unload grain silos receive suitable instruction in the hazards associated with the process and the measures they should take to minimise any outbreak of fire? (7.2.6)						
14.7.19	Are all silos subject to regular inspection and maintenance by a competent engineer? (7.2.7)						
14.7.20	Are agrochemicals stored away from other materials so that they are not exposed to fires originating in, for example, hay and straw? (7.3.1)						
14.7.21	Are the quantities of products containing significant quantities of hazardous materials, such as nitrates, stored on site kept to the minimum consistent with efficient farm operations? (7.3.2)						
14.7.22	When selecting a storage area, are checks made as to where any firefighting water will run? (7.3.3)						
14.7.23	Are spillages of agrochemicals and other materials in their vicinity cleaned up promptly to prevent contamination, such as the contamination of fertilisers by oil or diesel fuel? (7.3.4)						
14.7.24	Is an up-to-date inventory of the agrochemicals being stored and used maintained and made available for inspection by relevant authorities? (7.3.5)						
14.7.25	Are warning signs appropriate to the types of materials being stored displayed prominently on all buildings used for the storage of agrochemicals? (7.3.6)						
14.7.26	Is information provided to the fire and rescue service regarding the nature and quantities of hazardous materials stored or used on site? (7.3.7)						
14.7.27	Is information provided by suppliers relating to the properties, storage and use of agrochemicals read and observed and made available for staff and fire and rescue service reference? (7.3.8)						
14.7.28	Do all staff likely to handle or use agrochemicals receive suitable training in the hazards involved and the actions that should be taken in the event of a fire? (7.3.9)						
14.7.29	In the event of a fire involving herbicides, fertilisers and the like: <ul style="list-style-type: none"> • are all staff aware of the need to remain upwind of the smoke and toxic gases?; • if possible is the building ventilated to minimise the production of toxic gases?; and • to prevent firefighting run off water from contaminating water courses, is consideration given to allowing a fire to burn out under controlled conditions? (7.3.10) 						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.7.30	Are all spilt fertiliser and similar products disposed of safely following a fire? (7.3.10)						
14.7.31	Is the storage of flammable liquids, such as petrol, diesel fuel, oils, solvents and cattle dips in accordance with RC20: Recommendations for fire safety in the storage and use of highly flammable and flammable liquids and RC57: Storage in external fixed tanks? (7.4.1)						
14.7.32	Is the dispensing area around storage containers and tanks maintained to a high standard of cleanliness and free of potential ignition sources? (7.4.2)						
14.7.33	Wherever possible, is consideration given to replacing flammable liquids, such as sprays and crop treatments, with suitable water-based alternatives? (7.4.3)						
14.7.34	Is the manufacture of biodiesel carried out in accordance with RC46: Fire safety in the manufacture of biodiesel fuel? (7.4.4)						
14.7.35	Is specialist advice sought when other hazardous processes, such as the production of biogas from waste or biomass materials, is being undertaken? (7.4.5)						
14.7.36	Are cylinders of liquefied petroleum gas (LPG) and other gases stored and used in accordance with RC8: Recommendations for the storage, use and handling of common industrial gases in cylinders including LPG? (7.5.1)						
14.7.37	Is the number of cylinders of compressed flammable gases, especially acetylene, stored on the farm minimised? (7.5.2)						
14.8	Crop, woodland and undergrowth fires (section 8)						
14.8.1	Are ripe crops protected against all sources of ignition? (8.1.1)						
14.8.2	Are suitable measures taken to ensure that parties of school children and similar groups are adequately supervised when visiting farm premises? (8.1.2)						
14.8.3	In woodland where there are sustainable crops of trees, are new seedlings planted so as to provide an adequate fire break between areas when the trees have matured? (8.1.3)						
14.8.4	Is straw from fields baled and carted or chopped and ploughed into the soil before establishing the next crop? (8.2.1)						
14.9	Burning of waste materials (section 9)						
14.9.1	Is the burning of waste and vegetation avoided unless absolutely necessary? (9.1)						
14.9.2	Is all waste burning subject to a fire risk assessment? (9.2)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.9.3	If burning of waste materials is being considered, has prior approval been obtained from the Environment Agency for England and Wales, the Scottish Environment Protection Agency or the Environment and Heritage Protection Service in Northern Ireland, as appropriate? (9.3)						
14.9.4	Are fires only lit on open ground that has been cleared of undergrowth and is far enough removed (typically 50m) so that there is no risk of nearby crops, storage areas, buildings, structures or neighbouring property being set alight by burning brands? (9.4)						
14.9.5	Are materials only burnt in a properly designed incinerator? (The incinerator must be sited and maintained in accordance with the manufacturer's recommendations) (9.5)						
14.9.6	Is a permanent fire watch maintained by a nominated person? (9.6)						
14.9.7	Does the nominated person have suitable fire extinguishers, beaters consisting of poles with short lengths of a thick fabric or rubber (such as old conveyor belt) attached to the ends or other equipment to hand as appropriate to fight a fire and are staff trained in their use? (9.7)						
14.9.8	Is material to be burnt checked for dangerous items such as empty cylinders, aerosol cans and flammable substances? (9.8)						
14.9.9	Is burning avoided near or beneath overhead cables? (9.9)						
14.9.10	Is there a prohibition on the use of flammable liquids to assist in the ignition of fires? (9.10)						
14.10	Vehicles and farm equipment (section 10)						
14.10.1	When not in use, are farm vehicles garaged in a secure building, properly maintained and kept as clean as possible to prevent a build up of dust, straw, grain and similar materials? (10.1.1)						
14.10.2	Are farm vehicles housed securely in a detached building kept solely for that purpose? (10.1.2)						
14.10.3	If a fire were to occur, it may be necessary for vehicles and machinery to be evacuated from the building. Is an emergency plan to affect this drawn up and rehearsed? (10.1.3)						
14.10.4	Is access to the vehicle shed maintained clear to allow the vehicles to be driven or towed away from the building in an emergency? (10.1.4)						
14.10.5	Is vegetation on routes regularly used by farm vehicles cut short to prevent contact with vehicle exhausts? (10.1.5)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.10.6	Are engines allowed to cool before being sheeted over? (10.1.6)						
14.10.7	Is serious consideration given to installing a fixed fire suppression system in the engine bay(s) of expensive or business critical machinery? (10.1.7)						
14.10.8	Is there a prohibition on filling fuel tanks of machinery operated by petrol or diesel fuel while the engine is running? (10.1.8)						
14.10.9	Is there a prohibition on filling the fuel tanks of harvesters and tractors close to standing crops, straw bales or similar combustible materials? (10.1.9)						
14.10.10	Is any fuel leak repaired immediately? (10.1.10)						
14.10.11	Is retrieval of fuel from farm vehicles or equipment only undertaken using proprietary fuel retrieval equipment in accordance with the manufacturer's instructions? (10.1.11)						
14.10.12	Are exhausts, silencers and baffles checked regularly for defects and replaced as necessary? (10.12)						
14.10.13	Is electrical wiring protected against the effects of rainwater? (10.1.13)						
14.10.14	Where appropriate, is equipment bonded and earthed to prevent the build up of static electricity? (10.1.14)						
14.10.15	Is all equipment maintained and lubricated in accordance with the manufacturer's service schedule? (10.1.15)						
14.10.16	Are spare tyres stored in a well ventilated area away from sources of ignition with used tyres stored in a similar fashion if awaiting re-use? 10.1.16)						
14.10.17	In the case of conveyors and elevators, is the tensioning of drive or conveyor belts checked regularly? (10.1.17)						
14.10.18	Is combustible material, such as loose straw and hay, prevented from building up in the immediate vicinity of static equipment? (10.1.18)						
14.10.19	Is a careful watch kept for fires starting in grass grinders, elevators, conveyors and similar equipment as a result of frictional heat or by sparks created by stones, metal and similar foreign bodies passing through the machinery? (10.1.19)						
14.10.20	Are water boilers fitted with a thermostat and a thermal cut out in case of water being lost? (10.1.20)						
14.10.21	Is farm machinery containing a radioactive source clearly labelled? (10.1.21)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.10.22	Is spraying equipment sited outside the area in which spraying is to be undertaken to prevent sparks, hot engines and exhausts coming into contact with straw and other combustible materials? (10.2.1)						
14.10.23	Is a length of non-combustible piping fitted between the spraying equipment and the items to be processed? (10.2.2)						
14.10.24	Is a spark guard fitted to the spray nozzle? (10.2.3)						
14.10.25	Before commencing fogging, is a suitable and sufficient fire risk assessment undertaken, with special note being taken to eliminate any potential ignition hazards in the intended area of use? (10.2.4)						
14.10.26	As with all other specialist equipment, are the manufacturer's instructions and maintenance requirements observed? (10.2.5)						
14.10.27	Is the equipment used solely for its designed purpose? (10.2.6)						
14.11	Fire protection (section 11)						
14.11.1	Is a fire warning system provided where operations are carried out inside buildings? (11.1.1)						
14.11.2	Where indicated by the fire risk assessment, has serious consideration been given to the installation of an automatic fire detection and alarm installation, especially in buildings where there has been significant investment in vehicles, plant or livestock? (11.1.2)						
14.11.3	Does the fire alarm sound in the structure in which the fire is detected (either manually or automatically) and in the area immediately outside so as to summon assistance, especially where animals have to be evacuated? (11.1.3)						
14.11.4	Is a regular cleaning regime in place as part of the routine maintenance of automatic fire detectors? (11.1.4)						
14.11.5	In large operations, has consideration been given to linking the control panels of separate installations to a central point, such as the farm office, and to a commercial alarm receiving centre, which can alert the fire and rescue service without delay, especially in the event of a fire at night? (11.1.5)						
14.11.6	Are all agricultural buildings provided with a suitable number of appropriate portable fire extinguishers, approved and certificated by an independent, third-party certification body, in accordance with BS 5306-8? (11.2.1)						
14.11.7	Is portable firefighting equipment available where required in other external areas and on farm vehicles? (Where fire extinguishers are exposed to the environment, are they protected by proprietary cabinets or coverings?) (11.2.2)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.11.8	Where extinguishers are provided in unheated buildings, in external areas or on vehicles, has a suitable anti-freeze agent been added to the contents of water-based extinguishers by the service engineer at the time of the annual servicing of the equipment? (11.2.3)						
14.11.9	Are all fire extinguishers serviced at least annually by a competent engineer in compliance with BS 5306-3 and more frequently where determined by the fire risk assessment? (11.2.4)						
14.11.10	Is any extinguisher that has been damaged or partially used replaced without delay? (11.2.5)						
14.11.11	Do sprinkler installations comply with the LPC Rules for Sprinkler Installations incorporating BS EN 12845 ? (And are they designed, installed and maintained by an engineer with accreditation by an independent, UKAS-accredited third party certification body?) (14.2.6)						
14.11.12	Are only dry or pre-action sprinkler systems installed in unheated buildings? (11.2.7)						
14.11.13	Is a sprinkler system absent in the grain stores? (11.2.8)						
14.11.14	Have the fire and rescue service and an appropriate specialist been consulted regarding the provision of water for firefighting purposes and water supplies for sprinkler systems respectively? (11.2.9)						
14.11.15	Has the fire and rescue service unobstructed access to hydrants and other water supplies relevant to the site? (11.2.10)						
14.11.16	Where the provision of other forms of portable firefighting equipment is not viable, such as in woods and on heathland, are fire points set up and conspicuously signed? (11.2.11)						
14.12	Lightning protection (section 12)						
14.12.1	Are lightning protection systems maintained periodically, normally annually, to assure maximum protection and safety? (12.1)						
14.13	Security against deliberate fire raising (section 13)						
14.13.1	Does the possibility of arson form a major part of the fire risk assessment undertaken for the site under the Regulatory Reform (Fire Safety) Order 2005? (13.1)						

		Yes	No	N/A	Action required	Due date	Sign on completion
14.13.2	Is the security of farm premises against fires caused by vandalism, arson and careless members of the public taken into account when planning the location and design of new property? (13.2)						
14.13.3	If buildings have to be near roads, public footpaths, playing fields or other areas to which large numbers of members of the public have access, are they free of open sides or have easy access denied from the affected sides? (13.3)						
14.13.4	Are buildings secure against unauthorised entry without adversely affecting means of escape in case of fire? (13.4)						
14.13.5	Are fences and gates surrounding buildings, as well as those protecting livestock, kept in good repair? (13.5)						

➤ ANNEX A

Spontaneous combustion in hay

– indicators and risk improvements

Microbial growth and chemical reactions occur within baled hay when concentrations of moisture, oxygen and density create the right conditions for self-heating. Spontaneous combustion can then follow, generally within 4 to 6 weeks of baling, but on occasions up to 2 months later.

Humidity

The wetter the hay the more likely it is that spontaneous combustion will occur. If hay is stacked when it has more than about 20% moisture content the hay not only loses forage quality but also has a risk of self-heating. In addition, the wetter the hay the longer the period at which it will remain at risk.

All hay baled above 15% moisture content will show some sign of temperature elevation for the first few weeks in storage, this is normal and is known as 'sweating'. Steam rising from bales of hay is one of the early signs of this condition. Condensation may also appear on the roof of the building and on the eaves and mould will often be present on these surfaces.

Temperature

Self-heating of hay bales is one of the earliest signs that spontaneous ignition may later occur. The temperature inside the stack rises and when the internal temperature reaches in excess of 55°C the biological reactions that initiated the heating are replaced by a chemical reaction (oxidisation) that accelerates the self-heating process.

During 'sweating' the temperature peaks at between 51°C and 54°C within three to seven days. Temperatures then normally decline to safe levels over the next 15 to 60 days, depending upon the density of the stack.

Monitoring the temperature of the hay daily during the first weeks of storage is a necessary precaution.

Smells

During self-heating but before spontaneous ignition, hay will give off a smell similar to tobacco, but sometimes described as musty or like caramel.

Smoke

Smoke (not steam) is a warning sign that oxidisation is occurring within the stack and a clear sign that spontaneous combustion could be imminent. Care must be taken as attempting to move or break open bales at this stage will allow more oxygen to enter and cause ignition to take place.

It is essential that the following precautions are taken to reduce the risk of spontaneous ignition of stacked hay:

Storage arrangements

Barns and other structures used for the storage of hay should have as much ventilation as possible. Hay storage barns are normally designed especially for this purpose with open sides.

If the hay to be baled is in small rectangular bales, air channels should be provided leading to the outside of the stack as each layer of bales is placed. The bales should ideally be stacked on their narrow side (ie 'on edge' with the cut side horizontal). Bales stacked on their side in this way cannot be stacked as tightly as bales stacked flat, thus allowing more air movement through the stack.

If wetter, greener or heavier bales are identified, these should be placed at the outside of the stack where they have greater exposure to air, and not in the middle where they are insulated by the surrounding bales.

Humidity

To avoid fires, hay should be harvested and stored as dry as possible. It is essential to measure the humidity of the hay before and after harvesting.

For safe storage, small, rectangular bales should not exceed 18 to 22 percent moisture, and large round or rectangular bales should not exceed 16 to 18 percent moisture. In addition, the hay should be checked regularly for up to 2 months after baling and storage.

If a slight caramel odour or musty smell can be detected, then this is an indication that the hay in the middle of the stack may be self-heating. Some heating (sweating) must be expected, but at this point checking the moisture content is too late. If heating is thought to be taking place it is essential to monitor the temperature of the hay at least daily.

Temperature

During the first 14 days after storage regular daily temperature readings should be taken from different areas using a long probe to measure temperature deep within the stack.

Temperature	Diagnostic feature
55°C or less	'Normal' or 'safe' temperature
60°C	Hay turns brown and becomes 'sweet' due to caramelisation
65°C	The beginning of the danger zone – hay begins to blacken. Spontaneous combustion is possible.
70°C	Danger – measure the temperature every four hours and be prepared to call the fire brigade
80°C	Call the fire brigade and commence wetting the hay down

➤ ANNEX B

Straw and stubble burning – what is allowed

England and Wales

In England and Wales the burning of cereal straw, cereal stubble or the residues from other crops such as oilseed rape, field beans and peas is not permitted. There are a few exemptions to this ban. These include residues from linseed crops as, in some circumstances, soil and climatic conditions can combine to make burning linseed residues the only practicable disposal method. Broken bales, old straw stacks and straw used for animal bedding may also still be burned. Further information regarding exemptions may be obtained from the local authority.

On the rare occasions where burning is to be undertaken, it should be subject to an assessment, taking into account the strength and direction of the wind, the moisture content of the surrounding crops or grassland and the weather forecast. Further advice is set out in Annex C.

Scotland

While the burning of stubble and straw is strongly discouraged by environmental regulators, it is still permissible in Scotland.

Even where straw and stubble burning is allowed you must not emit dark smoke. (Dark smoke is finely divided particles of matter suspended in the air as a visible cloud.) Further advice is set out in Annex C.

Northern Ireland

In Northern Ireland the burning of stubble and straw in the open on the farm is strongly discouraged. If there is no alternative, burning will be allowed if there is an exemption registered with the Northern Ireland Environment Agency (NIEA) and the Department of Agriculture and Rural Development (DARD) guidelines are followed.

Registering for exemption in Northern Ireland allows waste plant tissue to be burnt in the open. This relates to:

- burning of logs, branches from fallen or felled trees, or hedge cuttings;
- burning of untreated timber from fence mending; and
- burning of cereal straw or cereal stubble.

However, the following materials may not be burnt in the open:

- other kinds of waste, such as paper or cardboard packaging;
- hazardous wastes; and
- waste materials brought in from other premises.

In these circumstances, up to 10 tonnes of waste may be burnt in any 24-hour period, but:

- waste materials are to be burned in the open on a bonfire;
- the burning must be carried out by the person who has produced the waste;
- the burning must be carried out at the place of production (for example at the farm where trees were cut down).

The ash may be incorporated into the soil if it is from the burning of cereal straw or cereal stubble.

Even if straw and stubble burning is allowed, dark smoke must not be produced. In Northern Ireland the emission of dark smoke is an offence under the Clean Air (Northern Ireland (NI)) Order 1981 (ref. 30) and, if smoke causes a nuisance, under section 107 of the Public Health Act 1878 (ref. 31) local councils may take action.

➤ ANNEX C

Fire safety when burning

The following advice is taken from The Crop Residues (Burning) Regulations 1993 (ref. 39).

When can I burn?

- Burning is not permitted on Saturdays, Sundays, or Bank Holidays.
- Do not light any fire before sunrise or later than one hour before sunset (sunset falls 30 minutes before lighting up time).

It is an offence to burn:

- within 100m of a motorway, dual carriageway, any 'A' road or railway line. You should never commence burning when the smoke may obscure the visibility on any road.

Firebreaks

- Firebreaks must be ploughed around the area to be burned.
- These breaks must be at least 10m wide when burning cereal straw and stubble and at least 5m wide for other residues.

Protecting vulnerable objects

- Burning is prohibited within 15m if burning cereal residues or within 5m for other residues to safeguard vulnerable objects, which include:
 - tree trunks (including coppice and shrub land);
 - hedgerows;
 - fences (not the property of the land upon which the burning is carried out); and
 - telegraph poles, electricity poles, pylons or substations.
- Burning is prohibited within 50m if burning cereal residues or within 15m for other residues to safeguard vulnerable objects, such as:
 - any residential building;
 - any structure with a thatched roof;
 - any building, structure, fixed plant or machinery which could be set alight by the fire;
 - any stack of hay or straw;
 - any mature standing crop;
 - any woodland or land managed as a nature reserve;
 - any building or structure containing livestock; and
 - any oil or gas installation on or above the surface of the ground.
- Any vulnerable objects lying adjacent to the area to be burned must be surrounded by firebreaks of 15m for cereal straw and stubble or of 5m for other residues.
- All intervening land between the firebreak and the vulnerable object must be cleared of all remaining residues or have all crop residues fully incorporated into the soil.

Distances between burns

There must be at least 150m between each separate burn. No area to be burned may exceed 10 hectares in the case of cereal straw and stubble or 20 hectares in the case of other .

Who and what must be present at each burn?

- Two responsible adults must be present, both of whom should be familiar with the regulations and know what to do in the case of emergency.
- One of these people, who should be experienced in the burning of crop residues, should be placed in general control of the operation.

At each block to be burned:

- at least five fire beating implements must be present; and
- at least 1000 litres of water in one or more mobile containers with a means of dispensing the water for firefighting purposes at a rate of 100 litres per minute must be present.

In addition, all vehicles used in connection with the burn must be fitted with a suitable and serviceable fire extinguisher. Ideally a mobile phone or a CB radio should be available at each burning site so that help can be summoned quickly if required.

After burning:

- check that no straw remains alight. Return later and make doubly sure;
- make sure the fire is extinguished by nightfall;
- incorporate all ashes into the soil as soon as possible, at least within 24 hours of beginning to burn.

Who should be told of the intention to burn?

It is a legal requirement that all of the following must be notified of the intention to burn at least one hour prior to and not more than 24 hours before commencing to burn:

- the environmental health department of the district council;
- the occupiers of all premises adjacent to the area to be burned; and
- air traffic control of any aerodrome with a perimeter fence within 800m of the area to be burned.

The law requires that you make all reasonable efforts to inform the persons and organisations required by the regulations, but it is recognised that, in exceptional circumstances, this may not always be possible.

Other relevant advice

- Burn only in suitable weather. Extra care is needed after a prolonged spell of hot, dry weather when the problems of control and smut pollution increase as the day progresses.
- Do not light a fire when the wind exceeds force 3 (8-12 mph) (wind of force 4 moves small branches) or if the wind direction is likely to create a hazard or annoyance through smoke or smuts.
- Avoid burning in still conditions; burn residues against the wind if possible.
- Be prepared to stop burning if the wind speed or the direction changes.
- Keep children away from the field.

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