

RISK MANAGEMENT PROGRAMME FOR BULK STORAGE OF GRAIN AND OILSEEDS

The potential for serious fire losses sustained by stores, distributors or dryers of grain, oilseeds and other similar crops can be reduced by implementing a practicable risk management programme to minimise potential hazards. A designated person should oversee the programme to ensure all aspects are properly managed and any required corrective action is implemented without delay. It is recommended that this Data Sheet is read in conjunction with the Home Grown Cereals Authority UK – Grain Storage Guide.

The following information is provided for guidance purposes only

1) SPONTANEOUS FERMENTATION/ COMBUSTION

As grains and oilseeds are living, respiring organisms, the control of moisture content, crop temperature and impurities are critical for their long term storage to prevent spontaneous fermentation, combustion and ignition. It is important that safe storage practice is adopted:

- a) Cooling, after drying is completed, to be undertaken as appropriate for the type of crop being stored and, where required, assisted by fixed or portable fan systems. In addition:
 - i) perforations and ducting in the flooring to be kept clear and cleaned before grain is loaded into the store
 - ii) the required air flow to be checked to ensure effective drying and cooling
 - iii) the filling auger to be moved whilst crop is being discharged to ensure excess dust build up does not occur on one location and restrict the airflow
 - iv) a stirrer, to increase airflow and ensure pockets of higher moisture are disturbed, is recommended
- b) there is a greater risk in some crops e.g. oilseed rape or linseed. The moisture content of the crop to be monitored regularly. To achieve safe storage conditions, the moisture content to be reduced, as soon as possible, to under 15% for grain and under 9% for oilseeds. If more than one drying run is required, the produce to be cooled before the second commences
- c) temperature probes to be evenly located throughout the stored crop to ensure representative data is recorded
- d) temperature monitoring and recording to be undertaken at regular intervals as appropriate and at least weekly. Any rise in temperature to be investigated promptly and actioned
- e) an Emergency Action Plan to be formulated and documented for control procedures to be

implemented in the event of overheating to ensure that grain or oilseeds can be removed quickly if required and alternative storage premises sourced. It is recommended that the Action Plan be discussed with the local Fire Officer to ensure Fire Rescue Service are fully aware of site emergency control procedures

- f) any detection of deteriorating conditions of storage such as unusual odours or visual signs of mould or insect infestation to prompt further inspection to investigate whether mould is developing.

2) STORAGE FACILITY

- a) Storage buildings (even when empty) to be maintained in a serviceable condition to:
 - i) ensure moisture content of the crop is not increased by rainwater ingress
 - ii) prevent the access of vermin and birds
 Appropriate action to be taken to remedy water ingress, bird and rodent activity
- b) To prevent contamination and infestation all openings in the external building fabric to be effectively sealed, and a pest control programme implemented by an experienced contractor or an appropriately trained employee to identify, monitor and control insects. Recommend use of “Insect” traps to identify potential infestation problems at an early stage
- c) Storage facilities not to be used for other ancillary activities such as plant repair/ workshops. Clear signage to this effect to be posted within the building. Vehicles not be parked in the stores



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- d) Incoming crop to be sampled on arrival for moisture content and treated according to the test results, with all sampling and analysis procedures carried out and documented in accordance with BS EN ISO 24333: 2009 Cereals and cereal products - sampling
- e) Incoming crop to be visually inspected for green material, impurities and insect infestation prior to acceptance into the store
- f) The storage facility to be inspected annually in accordance with relevant trade codes of practice.

3) ELECTRICAL INSTALLATION

Electrical installations present a serious potential fire inception risk and so risk management controls are essential including:

- a) electrical testing in accordance with the current edition of Institute of Engineering and Technology (IET) Wiring Regulations: BS7671 - 2008 Requirements for Electrical Installation, and/or current legislation, by an NICEIC/ECA or similar approved UKAS accredited body
- b) general fixed wiring inspection of the premises with IET Certification every 3 - 5 years in accordance with the recommendations of BS7671 and/or The Electricity at Work Regulations
- c) dryers, elevators and conveyors to be connected to the electrical installation in accordance with the current edition of the rules of the IET

It is also recommended that thermographic inspections are undertaken of all main electrical systems, plant and equipment with immediate corrective action taken in respect of any 'hot spots' identified.

4) DUST – DSEAR REGULATIONS

The drying and movement of grain generates significant quantities of dust which can explode if a source of ignition such as static electricity, grain drying, belt bearing failure or 'hot work' operations such as welding is introduced.

A Dangerous Substances and Explosive Atmosphere Regulations (DSEAR) risk assessment must be undertaken, and dust zone classifications identified (refer to regulations for zone details). Following the assessment any identified control measures must be implemented.

5) HOUSEKEEPING & MANAGEMENT

The following housekeeping controls to be implemented:

- a) a dust control and cleaning programme
- b) strict no smoking policy to be enforced within the building and suitable notices displayed to this effect
- c) external storage of combustible or trade waste materials to be at least 7m (but wherever possible 10m) from the fabric of the building, preferably within fenced or enclosed areas
- d) vegetation growing in the immediate vicinity of all buildings and structures to be cut back regularly
- e) all plant and equipment to be inspected, serviced and maintained in accordance with the manufacturer's recommendations but at least once a year, by an approved and qualified engineer or suitably trained and qualified person
- f) regular checks on bearings to elevators/conveyors to be undertaken
- g) essential maintenance works and servicing to be undertaken by an approved engineer under a strict permit to work system
- h) all records relating to periodic inspections, servicing and maintenance to be retained, ideally stored away from the premises.

6) CROP DRYERS

The application of heat to a combinable crop can create a major fire hazard and the following controls are recommended to help reduce the risks:

- a) where practicable, dryers to be sited in a separate building from the store or otherwise in an area segregated by walls, ceiling and doors achieving a minimum of 1-2 hours fire resistance for both integrity and insulation
- b) the dryer to be indirectly fired using a heat exchanger, but if otherwise fired adequate baffles to be provided between the furnace and the drying compartment. A suitable fire safety fusible link to be fitted to incoming oil supplies if applicable
- c) the operating temperature laid down for the operation of the plant by the manufacturer not to be exceeded. All temperature measuring devices, fire safety cut outs, thermostats and other automatic controls to be regularly maintained and serviced, with annual calibration of thermostats recommended
- d) transportable dryers which polish/clean in addition to drying produce dust and to be sited in open sided/ended buildings to allow a through flow of air. Consideration should be given to the use of dust collectors for this type of plant

- e) only automatic plant fitted with temperature measuring devices and auto-shut off in event of overheating to be left unattended during drying operation, with unattended plant visited by staff at regular intervals for fire safety checks
- f) all operatives to be trained and familiar with all plant emergency shutdown procedures, and a remote isolation switch provided
- g) all ducts and cavities where dust and other combustible materials may accumulate to be inspected and cleared daily. The space around the dryer to be kept clear of the dried crop and other combustible materials.

7) FIRE RISK ASSESSMENT

A fire risk assessment must be undertaken to identify and evaluate the potential risk hazards, as required by the Regulatory Reform (Fire Safety) Order and the Fire (Scotland) Act 2005. The assessment to consider the construction of the grain store working practices within, fire inception hazards and likely fire spread. Areas to be classified as high, medium or low fire risk. The results of the assessment must be documented, together with any action points arising, and reviewed regularly.

8) FIRE PROTECTION MEASURES

- a) To include an audible warning fire alarm system, to help early fire detection, which should conform to BS5839 minimum Category M (Manual) standard. Where involving large building shed ranges consider added installation of automatic detection with auto-signalling to raise early warning response
- b) Avoid unnecessary fire hazards in control rooms (such as portable heating appliances and LPG cylinders). Consider fire protection of grain store control room's high voltage electrical cabinets by installation of specific "In-Cabinet" gaseous extinguishing systems, e.g. "Firetrace" (www.firetrace.co.uk)
- c) Buildings to be provided with suitable and adequate wall mounted portable fire extinguishers located on emergency escape routes and at least one dry powder appliance located in each control room. Regular inspection and maintenance to be undertaken by an approved supplier and

recorded, and staff trained in the use of portable extinguishers

- d) In larger stores, where practicable, strongly consider additional hose reel provisions, subject to adequate training and instruction in use.

9) TRADE REFERENCE/TECHNICAL DOCUMENTS

The information above is for general guidance only and more specific technical information, advice and trade codes of practice is contained within the following publications (please note this list is not exhaustive):

- a) HGCA (Home Grown Cereals Authority UK) – The Grain Storage Guide
- b) AIC (Agricultural Industries Confederation) – TASCC (Trade Assurance Scheme For Combinable Crops) – Code of Practice for the Storage of Combinable Crops and Animal Feeds)
- c) GAFTA (Grain and Feed Trade Association) – Bulk Storage & Handling
- d) BS EN ISO 24333: 2009 Cereals and cereal products – sampling
- e) Red Tractor Farm Assurance – crops and sugarbeet standards.

IMPORTANT NOTE

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