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LPG Installations for Grain Dryers

Introduction

This guidance outlines safe practice in the use of LPG supplied to the burners of both fixed and mobile grain dryers. It is important that the essential safety aspects are fully understood by the operators of the equipment. This document can also be used as the basis of instructions from LPG supplier to the user.

Whilst the guidance is written around LPG being in storage vessels, either supplied by hire/rental arrangements or owned by the user, the same principles apply if gas cylinders are used. The guidance assumes liquid burners but the principles also apply to equipment supplied with LPG vapour (gas).

The Law

The Law imposes duties on the site operator to ensure safety obligations are met. Grain dryer sites are places of work, the operators and their personnel have a responsibility for safety to everyone on the site, including the general public.

Regulations

A variety of UK Health and Safety Regulations, made under the Health and Safety at Work Act 1974 will apply to the installation. The following are some of the Regulations that must be complied with:

- Dangerous Substances and Explosive Atmospheres Regulations
- Pressure Systems Safety Regulations
- Management of Health and Safety at Work Regulations
- Provision and Use of Work Equipment Regulations
- Regulatory Reform (Fire Safety) Order

The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations may also apply.

General Requirements

Dryer

The dryer must be set up on level firm ground in a position to comply with dryer manufacturer's instructions, with adequate distance from buildings, boundaries and flammable materials such as hay and straw.

For determining the safety distances, the whole of the dryer is considered to be a potential source of ignition.

Where the electrical supply is above 24 volts the installation needs to be in accordance with the current version of the IEE Wiring Regulations (BS7671), referred to as Wiring Regulations.

LPG Storage

LPG storage vessels and cylinders should stand on firm level ground or preferably on a concrete pad. In addition, cylinders shall be secured in the upright position.

The following minimum safety distances shall be maintained.

- Buildings, boundaries and potential sources of ignition shall not be less than 3m for cylinders or vessel up to 1.1 tonnes and 7.5m for vessel up to 4 tonnes. For larger vessels see UKLPG Codes of Practice 1 Part 1;
- The grain dryer shall be at a distance not less than that specified above, or as specified in the dryer instructions or 6 metres, whichever is greater.
- Notwithstanding the above, the grain dryer shall not be in a position where if the dryer becomes unstable it might fall on the cylinders or vessel; e.g. should the dryer be involved in a fire;
- Hay/straw stacks or other readily flammable material not less than 6 metres from the cylinders or vessel.

The position of the cylinders or vessel should:

- Be protected from vehicle movements;
- Permit safe access for road tanker and for safe filling;
- Allow access for emergency service vehicles

Due to the potential danger LPG vessels shall only be moved by the vessel owner, who must be competent to do so. Unauthorised movement may result in legal action by the Health and Safety Enforcement Authority.

Where mobile LPG storage is required the provisions of ADR must be complied with and there are three options:

- a) A portable tank in compliance with section 6.7 of ADR
- b) LPG pressure drum/s complying with section 6.2 of ADR;
- c) LPG cylinders.

A vessel designed for static use simply placed on a trailer is not acceptable and shall not be permitted. Mobile storage when positioned for use must be firmly immobilised and stabilised on level ground so that the vessel is in the correct attitude.

Connection between the storage and the dryer

Wherever practical, fixed pipework should be used between the storage and the dryer. Hoses should be kept as short as practicable.

Pipework specification and installation should comply with UKLPG Code of Practice 22

Protection against corrosion and mechanical damage is essential with special attention to avoiding vehicular damage.

Where liquid can be trapped between isolation valves, hydrostatic relief valves shall be incorporated to protect against overpressure.

A quick acting isolation valve shall be installed before the inlet to the supply pipework. For single vessel installations this may be the vessel outlet valve, but for multiple vessel installations it will be on the outlet of the vessel manifold.

When not in use, pipework should be de-pressurised and the ends securely capped or plugged. Where hose is used it should be to BSEN1762, kept as short as practicable and adequately protected against mechanical damage. Note: Normal hydraulic hose is not suitable.

Periodic inspection and re-testing of any hose is essential, hoses up to 25 mm nominal bore shall be visually inspected every year until they are 5 years old, they then need to be pressure tested. Hoses 25 mm nominal bore and larger, plus any hose over 5 years old shall be pressure tested annually.

If long lengths of hoses are used, then protection against vehicular and other mechanical damage is required. Positive barriers with adequate warning notices to warn vehicle drivers of the presence of the hose shall be provided.

When not in use it is recommended that pipework is depressurised and the cylinder or vessel outlet valve is locked in the closed position.

When disconnected, the hose outlet shall be suitably plugged to avoid contamination

Fire Precautions and Emergency Procedures Key instructions:

- The nearest source of water for fire brigade use should be noted;
- Buckets of water on hand may serve to extinguish small non-LPG fires before they escalate
- Dry powder fire extinguishers should be on hand at the installation. If more than one fire extinguisher is used to provide the 9kg of dry powder, one should be a minimum size of 6kg
- In the event of an escape of gas (LPG) shut-down the dryer immediately and, providing safe to do, turn off the gas at the cylinders or vessel;
- If the gas ignites, or if a non-LPG fire occurs - call the Fire Brigade immediately, tell them of the presence of LPG and keep personnel well away;

Training Instruction for Operators

The Provision and Use of Work Equipment Regulations require, "every employer to ensure that where work equipment is likely to involve a specific risk, the use of that equipment is restricted to those persons given the task of using it and repairs, modifications maintenance or servicing that work equipment is restricted to specifically designated persons whom the employer must ensure have received adequate related training".

Adequate training or instructions on the use of the LPG storage, of whatever type, should be provided by the LPG suppliers to the user. This should cover at least the following:

- How to shut off the supply of LPG from the storage vessel;
- Making/breaking connections to the storage vessel - if applicable;
- Routine checks including hoses; Ø Action in the event of a gas escape;
- Other emergency action;
- Treatment of cold burns
- Arrangements for refill deliveries;
- Positive shut-down of dryer for an adequate time to cool before a LPG delivery is made;
- Handling of cylinders;
- Prohibition on moving storage vessel.

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