

Rural Development Programme 2014 – 2020



Farm Business Improvement Scheme - Capital Tier 2 (Tranche 1)

Minimum Specification and General Guidance
for Slurry Storage Systems



Department of
**Agriculture, Environment
and Rural Affairs**
www.daera-ni.gov.uk



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'The European Agricultural Fund
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Farm Business Improvement Scheme - Capital (FBIS-C) Tier 2 (Tranche 1)

Minimum Specification and General Guidance for Slurry Storage Systems

Please read this booklet carefully before completing the application form.

It is also recommended that you refer to the relevant FAQ's on the DAERA website.

DAERA reserves the right to make changes to the requirements during the lifetime of the FBIS – C Tier 2.

Copies of this document can be made available, on request, in alternative formats e.g.

- Large Print
- Audio CD
- Braille
- Computer Disc

Tier 2 of the FBIS-C is administered by the Department of Agriculture, Environment and Rural Affairs (DAERA). If you require assistance please contact:

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Introduction

This booklet details the minimum structural requirements for slurry/effluent storage tanks. In addition to the mandatory minimum requirements, there are some recommended procedures or construction details; these constitute advice on good practice and highlight Health and Safety recommendations. Any details on specifications are given to assist engineers/applicants with the development of their construction proposals. DAERA does not accept design responsibility for storage tanks constructed in accordance with the specification, and shall not be liable for any loss or damage resulting from the failure of any structure to perform as expected.

Applicants should appoint a Chartered Engineer to prepare the design.

References to Standards are to the current edition of the British or European Standards and the UK National Annex for European Standards where applicable. This booklet should be read in conjunction with other Explanatory Booklets for the Farm Business Improvement Scheme – Capital, Tier 2 (FBIS-C).

General Requirements

Slurry tanks, together with any associated pipe work and transfer channels, shall be designed to meet the requirements of BS 5502. All designs should be prepared to all relevant standards directly or under the supervision of a Chartered Engineer (Civil or Structural). The Engineer responsible for the design should ensure that the facility is constructed as specified in the design and may be required to inspect the works at regular intervals during the construction. The chartered engineer shall, if required certify that it complies with the minimum requirements of the relevant British Standards.

All facilities for the storage of slurry or effluent must also comply with the requirements of The Nitrates Action Programme Regulations (Northern Ireland) 2014. This regulation covers a range of issues connected to the collection and storage of slurry/effluent including the tank location, minimum number of weeks storage, pipework etc. All aspects of the installation shall have a minimum design life of 20 years. The recommended freeboard stated for the type of storage facility stated in this Regulation should be used in the storage calculation and adhered to at all times.

This Regulation also requires the siting of any slurry/effluent storage facility at a location greater than 10m from a water course/50m from fresh water well. Where this cannot be achieved NIEA must be notified before commencement of construction. Where this occurs confirmation of NIEA's approval to construct a tank in the proposed location must be submitted to DAERA before Letter of Offer is issued.

Signs warning of dangerous gases, no smoking and no naked flames should be placed near all access points of the tank. All other Health and Safety recommendations must be adhered to.

A handbook needs to be supplied to the applicant where the respective standards states such for the selected storage facility.

Below ground tanks coverings can be funded. At claim stage a certificate must be supplied stating the maximum loading for all components, including manhole covers. All components that make up these coverings must be CE marked. Above ground stores covers must be submitted with the confirmation that the tank has been designed to accommodate the cover.

Below Ground Slurry Tanks and Reception Pits

All below ground slurry/effluent tanks shall be in-situ concrete or pre formed construction; blockwork walls are not permitted.

All below ground tanks, which are going to have a building constructed above the tank either as part of this project or in the future, must be extended beyond the external walls of the building to provide adequate outside access and mixing points. If the new below ground slurry tank is to have a livestock building erected over it and which cannot be mixed completely from outside the building, the proposal must include details on how the tank will be mixed without having to enter the building to mix it. Internal mixing points are not recommended and all proposals will be assessed on this matter and HSENI may be consulted. Where additional equipment is required to achieve effective and safe mixing e.g. bubbler system, these costs are eligible.

Where the proposed project is the construction of a new building over an existing tank there must be external access and mixing points. If the tank cannot be completely mixed from outside the new building, the proposal must include details on how the tank will be mixed without having to enter the building to mix it.

Exterior mixing points must have a load bearing solid or slatted cover with the maximum load specified on the certificate from the supplier.

Where silage effluent is entering into a slurry/effluent tank via a pipe, the pipe should extend at least 300mm from the inner face of the tank wall.

Below Ground Preformed Slurry Tanks and Reception Pits

Preformed tanks (precast concrete, plastic, GRP, or metal) shall be supplied by specialist manufacturers as suitable for slurry/effluent storage. They shall be chemical resistant and come with a 20 year minimum manufacturer's guarantee of durability. They shall be installed in accordance with the manufacturer's instructions. If land drains are required to reduce ground water pressure advice and prior written approval should be sought from EHS.

Cover Slabs / Slats

All below ground slurry tanks must be covered with slats or solid covers/slabs. These must be designed to carry a loading appropriate to its sitting and proposed use or a minimum of 10kN/m². However it is common for the maximum loading to be recorded as the maximum axle loading. It is important that the maximum loading for the type of solid cover/slat selected meets the proposed maximum vehicular loading.

Solid slabs are commonly used as feed/trafficked passage covers and the areas outside the perimeter of the building. It is important to ensure these slabs when used for passage covers meet the typical axle loading of modern farm machinery. In some cases the desired loading may require a structural concrete screed to be placed on top of the slab to achieve this loading. This screed must be designed by a chartered engineer and the maximum loadings certificate issued to applicant.

In some cases the tank coverings are placed on suspended beams which are supported with internal piers. The design of the piers must be included in the overall tank design and included in its certification by the chartered engineer. The pre-cast supporting beams must be designed in conjunction with the proposed cover loading, including a screed, where applicable and also certified by a chartered engineer.

Concrete slats shall comply with BS EN 12737: 2004. They shall be CE marked and have an accompanying Declaration of Performance.

- Be free from any cracks, honeycombing, and chipping of the top corner arises
- Have a full bearing of at least 150mm at points of support
- Finished slat floor shall be level and free from any rocking movement

Emphasis within this scheme is placed on animal welfare and hence the surface finish of the slats should be considered to reduce risk to animal health through slips etc.

Where the proposed project is for a slatted floor in houses designed for smaller animals e.g. calves, pigs, sheep etc, the design of the slat should be in accordance for the type of animal which will be housed on them. For these types of houses, a description of the type of slat proposed should be provided at application stage and certified at claim stage. This would include the supporting beams and slats loading.

Access Manhole Covers

In trafficked areas access manhole covers shall be designed for the proposed maximum loading in accordance with the recommendations at table 4 in BS 5502 - 22.

All covers must be adequately secured in position to prevent opening by a child. Covers can be concrete or galvanised metal covers and shall be CE certified and maximum load bearing certificate is required.

A metal grid shall be securely fixed below the cover as a precaution against persons/livestock falling into the tank when the cover is removed. As a minimum the grid shall be made of 16mm diameter mild steel bars in each direction at a spacing not exceeding 150mm to form a lattice grid. It shall be galvanised after manufacture. The grid shall be either fixed in position or permanently hinged at one side.

Floor and Walls

Floors and walls shall be of reinforced concrete construction a minimum of 250mm thick. Walls shall be designed to comply with all the relevant parts of BS 5502 and the loadings given therein. All walls shall have horizontal and vertical reinforcement on both faces to withstand slurry/soil loading and to control cracking of the concrete.

Water bars shall be provided at all joints in the wall and floor, including at the base of the wall, and junctions of water bars shall be fully welded.

Walls shall be formed with a kicker, approximately 200mm high, cast along with the foundation unless the use of kickerless construction is approved by the Chartered Engineer responsible for the design.

Shuttering

Steel shuttering is recommended for tank walls but panels lined with timber may be used. All shuttering must be clean and tight fitting to prevent loss of grout. To maintain cleanliness and facilitate removal they should be oiled lightly with proprietary mould oil prior to each use. Care must be taken that oil does not get onto reinforcing bars and prevent bonding. All shuttering must be properly tied and braced to withstand the pressure of the concrete.

Concrete

Concrete shall be produced in an audited plant only: It shall not be produced on site. It shall comply with that specified at Annex 1 in the 'Explanatory Booklet on the Design of Agricultural Buildings'.

Any additives used shall comply with BS EN 934; they shall be used strictly in accordance with manufacturer instructions and shall be added at the ready-mix plant.

Where polypropylene fibres are specified they shall be used in strict compliance with manufacturer's instructions and shall only be added at the concrete manufacturing plant. Only fibres which have been tested and approved by British or European approval authorities may be used.

The Department reserves the right to require that concrete should be tested in accordance with EN 12390 and EN 12504.

Reinforcement

Steel reinforcement to be high yield (grade 500N/mm²) Type 2 bars, complying with BS 4449 and shall be sourced from companies holding valid certificates of approval for product conformity issued by the UK Certification Authority for Reinforcing Steels (CARES).

All steel shall be free from mill scale and heavy deposits of rust. Reinforcing bars shall be cut and bent to the required shapes. Bars shall not be straightened and re-bent. Cover shall be achieved and maintained by the use of spacer blocks.

Above Ground Slurry Stores

Above ground storage tanks may be of steel or concrete fabrication. They shall have a minimum 20 year design life including all sealants and jointing materials. The base of the store should have drainage falls designed to drain grit/stones/sediment to the outlet pipe connected the slurry tanker draw off point. All joints between panels shall

be fully sealed to provide a leak proof structure. The connecting pipe between the store and the reception tank must have two lockable valves in series, approximately 1m apart.

A slurry tanker / umbilical pump draw off point should be provided through the base of the slurry store. This draw off point should be fitted with two lockable valves in series. The draw off points should be protected against mechanical damage by suitably located bollards or similar. To ensure a clean slurry tanker filling operation, the store should be equipped with a tanker fill pipe drain facility to allow surplus slurry in the tanker pipe to be drained to the reception tank or a drainage sump once the tanker has been filled.

A platform gantry plus access ladder to be fitted and loading must be certified by the engineer. The ladder shall be fitted with either;

- a demountable bottom section, or
- a lockable bottom section.

Foundations and Base of Tank

All proposed sites for above ground stores must be assessed and the reinforced concrete foundation / base slab for the tank shall be designed and constructed in accordance with the requirements of the chartered engineer. As this is an integral part of the complete tank it shall be included in the certification of the tank at completion.

Above Ground Slurry Tank Covers

It is recommended that above ground slurry tanks should be fitted with a cover and the store must be designed to support it. The cover shall be designed to contain smells and shed rain water. The cover should be;

- UV, Slurry and Weather resistant
- High tensile strength PVC / Polyester
- Mounted on to the tank's edge in such a way as to avoid wear and tear from the rim of the tank
- The cover to have inspection hatch for ease of agitation

Funding is available where the fitting of a cover to an existing above ground store demonstrates that the additional storage, obtained by fitting a cover, meets the minimum storage requirements and represents value for money. Confirmation from the store manufacturer that the cover does not affect the structural integrity of the existing store will be required at application stage.

Slurry Pumps / Mixers

Slurry pumps / mixers can be either tractor driven or electrically operated pumps designed for the purpose of pumping / mixing slurry. The pumps should be able to run when empty, be of robust construction with effective chopping devices, and have long service life. The pumps should be suited to capacity of tanks and pumping distance. Electrically operated pumps must be permanently fixed in position.

All pumps must be CE marked and have a manufacturer's unique serial number.

Pumping Main

Slurry and dirty water may be pumped underground from one part of a farmyard to another for the purposes of additional storage / separation. The installation / jointing of the below ground pumping main and its associated work shall be the responsibility of a pipe laying contractor who shall be a specialist in this form of construction. It is recommended that the pipe laying contractor has an ISO 9002 Quality Accreditation and uses only materials from an ISO 9001 Quality Approved Manufacturer. As a minimum the work shall be performed to a standard accepted by a recognised European accreditation body.

Slurry pipes, fittings valves etc shall comply with BS EN12201 and Water Industry Specification 4-32-08. Pipes to be Medium Density Polyethylene (PE80) with a minimum pressure rating of 10 bar and fusion jointed if required. Pipes to be air tested on completion.

Slurry Transfer Channel

A slurry transfer channel can be used to move slurry from one storage facility to another. It shall be no deeper than 1.0m from the top of the cover to the top of the floor. Channels should be laid without falls. A 150mm high (wedge shaped) overflow lip should be installed in the channel at the discharging end. Channels shall be constructed in reinforced concrete a minimum of 250mm thick.

Where new channels are being introduced to existing slabs the side joints shall be saw cut. Long and cross joints (not more than 6m apart) must be sealed with materials which are resistant to acids, farmyard manures and other agricultural wastes.

Pre-cast concrete channels can be used where they achieve the same performance and structural specification as in-situ channels. They shall be supplied by specialist precast concrete suppliers. They shall comply with BS EN 13255, shall be CE marked and have an accompanying Declaration of Performance.

The channel cover slab shall be designed to carry the loading appropriate to the situation or a minimum of 10kN/m².

Earth Bank Slurry Lagoons

Earth bank lined lagoons must be fitted with a floating cover. The lining company is responsible for all aspects of the work and shall be a specialist in this form of construction. It is recommended that the lining contractor has an ISO 9002 Quality Accreditation and uses only materials from an ISO 9001 Quality Approved Manufacturer. As a minimum the work shall be performed to a standard accepted by a recognised European accreditation body.

A certificate shall be required from the lining contractor to cover the work (including ground preparation). The certificate shall state that all the welds have been examined and pass all relevant tests. The certificate shall also incorporate a guarantee that the lining shall remain impermeable for a minimum of 20 years.

All other works can be completed either by the lining contractor, or in accordance with the lining contractor's instructions.

The agitation points should consist of a;

- standing area at the top of the bank with a suitable wheel stop
- a sloping slab of concrete
- an agitation pad of concrete on the lagoon floor

The structural design of these components including the foundations, detailing and construction requires certification by a structural engineer and to include the maximum loading on the standing area.

There must be a permanent stock-proof and child proof fence, a minimum of 1.8m high, around the perimeter of the lagoon. Entrances to the mixing points or any pedestrian entrances must be secured with a lockable gate, a minimum of 1.8m high and constructed in such a manner that it cannot be climbed to gain access.

A suitable permanent method of emergency escape from the lagoon pit must be installed close to the agitation point. A warning sign with black writing (100mm high) on a yellow background shall be erected at all entrances stating **SLURRY STORE DANGER OF DROWNING**.

Floating covers must be fitted and must have a minimum design life of 20 years. It shall be rainproof with welded joints and not allow rainwater to mix with the slurry. It must be completely secure and not susceptible to wind damage. A suitable opening to allow mixing must be included along with any system to reduce the build up of gases.

Concrete Aprons

Concrete aprons are eligible where there are mixing points or draw off points at slurry tanks. Concrete aprons shall not exceed 6m from:

- The outer edge of the below ground tank and no wider than the total width of the tank at its narrow side, for multiple mixing points at the end.
- The outer edge of the below ground tank and no more than 6m for a single mixing points / draw off point at the end.
- The outer edge of the below ground tank and no more than 6m where there are a number of mixing points along the longest side.
- The edge of an above ground store and no great than the diameter of the store.

The design engineer is responsible for the specification of the concrete apron and shall provide certification of the axle loading. The design must include the facility to retain any surface water when contaminated to comply with The Nitrates Action Regulations.

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