

AN ROINN TALMHAÍOCHTA, IASCAIGH AGUS BIA
DEPARTMENT OF AGRICULTURE, FISHERIES AND FOOD

MINIMUM SPECIFICATION FOR LOOSE DRY SOW UNITS

The receiving of this specification does not imply approval of a grant application. However, if written approval is issued, then this specification becomes part of the contract between the applicant and the Department of Agriculture and Food.

This is a minimum specification. Where the word “SHALL” is used, then that standard (at least) **must** be followed in grant-aided buildings. Where a procedure is “RECOMMENDED”, this is advice only on good practice.

Note that all references to other Department Specifications are to the current edition of that specification [available on the Department of Agriculture and Food Website (www.agriculture.gov.ie) under Farm buildings]. Similarly, references to Standards are to the current edition of the Irish, British or European Standard, as appropriate.

This specification covers the design, ventilation, insulation and internal layout of Dry Sow Units. **For the design and construction of a building’s superstructure, Department Specification ‘S101: Minimum Specification for the Structure of Agricultural Buildings’ shall be read and followed alongside this specification. For the design and construction of reinforced concrete tanks and slurry channels, Department Specification ‘S123: Minimum Specification for Bovine Livestock Units and Reinforced tanks’ shall be read and followed alongside this specification. However, if the building is not within the specification, then a full set of design drawings and full structural calculations shall be prepared by a chartered engineer, and given to this Department for prior approval before the start of construction.**

1 Safety

1.1 Responsibility for Safety

Applicants are reminded that they have a duty under the Safety, Health, and Welfare at Work Act 1989 to provide a safe working environment on the farm, including farm buildings, for all people who may work on that farm. There is a further duty to ensure that any contractor, or person hired to do building work, provides and/or works in a safe environment during construction.

1.2 Safety during Construction

Farmer/Applicant Responsibility: Please note that neither the Minister nor any official of the Department shall be in any way liable for any damage, loss or injury to persons, animals or property in the event of any occurrence related to the development and the applicant shall fully indemnify the Minister or any official of the Minister in relation to any such damage, loss or injury howsoever occurring during the development works.

Dangers: Where the applicant/farmer is undertaking any part of the above work, it is his/her responsibility to seek competent advice and to undertake all temporary work required to ensure the stability of excavations, superstructure, stanchion foundations, wall foundations, to guard against possible wind damage and to avoid any other foreseeable risk. It is also his/her responsibility to ensure that any drains, springs or surface water are diverted away from the works.

Power lines: Farm buildings shall not be constructed under or nearer than 10m to an overhead power supply. If advice is required, or if power lines need to be diverted, it is the applicant’s

responsibility to contact, in writing, the local ESB supervisor before construction commences and then to follow the ESB conditions.

Danger to children: It is the applicants responsibility to prevent children from playing or spending time in the vicinity of any construction work.

1.3 Safety Notices

It is recommended that at least one safety notice should be put on the side of a building next to which a slurry agitation/emptying point is situated. The notice should be as close to the agitation/emptying point as possible. [Notices are available from most farm supply outlets and Teagasc].

1.4 Toxic Gases and Agitation

Harmful gases are generated in slurry stores and these have been responsible for both human and animal deaths. Good ventilation in slatted buildings is always important, and is vital during agitation or emptying of the tanks. Therefore:

1. Tanks shall always be agitated and/or emptied from the external agitation points, and never from openings within the house.
2. Ventilation levels shall be set to their maximum rates before agitation begins and maintained at the maximum rate until completion of tank agitation.
3. No person shall enter the house during agitation. It is strongly recommended that animals be removed from the house before agitation. It is also recommended that animal holding pens are installed close to the house to facilitate this removal.
4. Some poisonous slurry gases are heavier than air. No person should climb down into an emptied or part-emptied tank without breathing apparatus. Such apparatus requires full training before it can be used.
5. In cases where slurry can flow from a house into the tank under a new house care should be used to ensure that there are no ventilation dead spots within the building and that ventilation levels are always set to ensure sufficient air movement to rapidly remove any gasses that may be produced. If possible slurry should not be allowed to flow from another tank into a tank under a building due to the risk of production of lethal gasses.

1.5 Maintenance

All farm buildings require regular maintenance to ensure the health and safety of personnel and animals. Fittings such as slats, electrical fittings, drinking arrangements, etc., should be periodically checked, and all defective items replaced.

2 CONCRETE SPECIFICATION

2.1 Certificates

Concrete shall be produced in a plant audited to I.S. EN 206-1: 2002 by a certified body accepted by The Department of Agriculture, Fisheries & Food (e.g. N.S.A.I., B.S.I., Q.S.R.M.C). Concrete shall not be produced on site.

A numbered certificate, signed and stamped, shall be required for all concrete delivered to site. The certificate, the "Concrete Manufacturers' Specification Certificate", is produced in triplicate. The top certificate, printed on light blue paper, shall be retained by the applicant and given to and

retained by the local AES Office of the Department of Agriculture for inspection upon completion of the works.

2.2 Concrete

For all Dry sow housing, and slurry tanks under dry sow houses, concrete shall be purchased on the basis of a characteristic 28 day crushing strength of 35N/mm². Minimum cement content shall be 300 kg/m³. Slump of unplasticised concrete shall not exceed 90mm, and maximum aggregate size shall be 20mm.

The concrete shall be ordered by requesting ‘35N concrete to be certified to the grant-aid standard of the Department of Agriculture and Food’.

If the Concrete Supplier requires further information the following shall be quoted to them:

- The concrete is to be to I.S. EN 206-1:2002: Strength Class: C28/35, 300 kg cement, maximum water cement ratio of 0.60, Exposure classes: XC4, XF3, XA1 (20 year life), Slump class: S2 (unplasticised), maximum aggregate size 20mm.

If plasticised concrete is desired, the slump class shall not exceed S3.

Polypropylene fibres may be incorporated into the concrete mix to improve the properties of concrete. Only fibres which have been tested and approved by National or European approval authorities may be used. The use of fibres helps to reduce plastic cracking and improve surface durability but they are not a substitute for structural reinforcement. Fibres shall be used in strict compliance with manufacturer’s instructions and shall only be added at the concrete manufacturing plant. The concrete certificate (Clause 2.1) shall clearly show the amount and type of fibre added. The mix design, compacting, and curing of fibre concrete is the same as concrete without fibre.

2.3 Materials

Cement used in concrete and concrete products shall be certified to IS EN 197-1, and shall bear the Irish Standard Mark, or shall be certified by NSAI to be equivalent to IS EN 197-1. All aggregates shall be to IS 5 1990. Plasticisers and other admixtures shall be to EN 934. All admixtures shall be used in strict accordance with manufacturer’s instructions, and shall be added only by the concrete-mix manufacturer.

2.4 Tests

The Department reserves the right to require that concrete should be tested in accordance with BS1881, and that installed reinforcement may be checked by electronic or other means.

2.5 Compaction of Concrete

All concrete shall be compacted by either vibrating screed or poker vibrator depending upon the position of the concrete. Poor compaction leads to entrapped air, which will weaken the concrete and may cause premature failure. All concrete can be easily placed and compacted when using a vibrating screed or poker vibrator which helps ensure the concrete achieves its full strength.

2.6 Curing of Concrete

All concrete shall be cured by keeping it thoroughly moist for at least seven days. Wetted floor slabs and walls shall be protected by polythene sheeting, kept securely in place. Alternatively proprietary curing agents may be used in accordance with manufacturer's instructions. When frost is a danger, straw bales shall be placed over the polythene on slabs. Concrete shall be at least 28 days old before being subjected to full load.

3 ELECTRICAL INSTALLATIONS

Wiring and fittings shall be installed, and all work shall be carried out in accordance with the Second Edition of the National Rules for Electrical Installations, ET 101/1991 and Amendment A1:197, and specifically Section 705 - Electrical Installations for Agricultural and Horticultural premises. An ETCI completion certificate shall be required, signed by the Electrical Contractor(s) or a person duly authorised to act on his/her behalf to certify that the electrical installation has been constructed and/or has been tested according to the National rules of Electrical Installations and has been found to be satisfactory. An associate certificate, specifically for agricultural work, the "Supplementary Agricultural Certification Form" shall also be signed by the Electrical Contractors or authorised persons and the number of the main ETCI completion Certificate clearly marked on it. If no valid numbered ETCI Certificate is available for the completed installation, then the Electrical Contractor shall complete a new numbered ETCI Certificate indicating that the new installation has been tested for safety and compliance, and note that number on the Supplementary Form. The signed printed "Supplementary Agricultural Certification Form" together with a copy of the ETCI Completion Certificate shall be given to the Department before grant-aid can be finally certified.

4 SITE

Particular attention shall be paid to the siting of a new dry sow house in relation to access, other existing and proposed livestock housing, feed stores and possible extensions. In all cases, care shall be taken to avoid endangering rivers, streams or wells by pollution. All surface water draining on to the site from higher ground, or any under-drainage passing through the site, shall be intercepted and diverted.

The site shall be carefully chosen with a view to minimising operational and constructional problems. It shall be well separated from potential fire hazards, and sheltered if possible. As a general guide, a storage facility for silage effluent/slurry/soiled water should be located not less than 50m from any waterbody in the case of new farmyards, and not less than 10m in the case of extensions/modifications to an existing facility. The minimum distance between a new waste storage facility and a public/private water supply source, either surface or ground, shall be 60m. In vulnerable situations this distance shall be increased up to 300m.

5 Design of Buildings

5.1 General Design

All sows and served gilts shall be group housed from 4 weeks after service until 1 week before farrowing. The group pens shall normally be for not less than 4 sows or served gilts, but a limited number of pens for 3 sows or served gilts may be provided in exceptional circumstances. **The use of tethers is not permitted.** Stalls may be used for the first 4 weeks after service and the last week prior to farrowing. A maximum of 33% of the sow spaces may be provided as stalls. Each pig shall be able to lie down, rest and stand up without difficulty. Each pig shall have access to a clean lying area that is physically and thermally comfortable, adequately drained and that is of sufficient area to allow each pig to lie down at the same time.

The chosen feed system shall allow all sows and gilts to obtain sufficient food and water, even when competitors for food are present. All pigs shall be fed at least once a day.

The design of the house shall be such that every pig can be inspected daily, and that pigs shall not be exposed to continuous noise levels at or above 85dBA.

All pigs shall have permanent access to a sufficient quantity of suitable material (e.g. straw, hay, silage, wood, peat or mushroom compost) to enable proper investigation and manipulation activities.

Building materials used shall not be harmful to the pigs and shall be capable of being thoroughly cleaned and disinfected.

Insulation and ventilation control shall be provided to ensure that in slatted units the temperature is capable of being maintained between 15°C and 30°C at all times. In less densely stocked houses heating facilities may be required. Straw bedded houses shall be designed to be thermally comfortable at all times, and at no stage should the air temperature be allowed to exceed 30°C.

Essential Management: All automated or mechanical equipment essential for the health and welfare of the pigs must be inspected daily (e.g: ventilation, water supply, feed supply, etc.). Where defects are discovered, these must be rectified immediately, or if this is impossible, appropriate steps must be taken to ensure the health and welfare of the pigs.

5.2 Roof Structure

All roof structures shall comply with Department of Agriculture, Fisheries and Food specification S. 101: Minimum specification for the Structure of Agricultural Buildings. Alternative proprietary construction systems (e.g. proprietary structural wall panels) may be used if such systems have received the prior acceptance of the Department. Gutters and downpipes shall be fitted to all roofs and arranged so as not to discharge onto soiled yards. All metal cladding fixed to timber rails or purlins shall be separated by a layer of DPC. The use of painted aluminium cladding and sandwich cladding are permitted in addition to those cladding sheets listed in S.102.

The internal ceiling height of the roof over the interior floor level shall not be less than 2.2m. Eaves height in a straw bedded house shall be not less than 3.5m. The internal ceiling height, above the floor level, in a mono-pitched slatted house shall not be less than 1.9m at any point. When an existing building is being converted these limits may be reduced, in exceptional circumstances, by up to 600mm.

5.3 Insulation of Roof

Roof insulation shall be of the following:-

- 1) 60mm extruded polystyrene; or 60mm expanded polyurethane or 75mm expanded polystyrene, protected on the underside by a vapour barrier.
- 2) 90mm glass wool on continuous vapour barrier supported by a fiber-reinforced board, or oil-bound hardboard ceiling.
- 3) 50mm of sprayed expanded polyurethane foam.
- 4) Other material of equivalent insulating value and with vapour barrier if required.

Insulating boards shall be tongue and grooved, or have tapered edges on all sides to prevent vapour transmission. Roofs shall be constructed to prevent rodent access to insulation material.

Roof insulation may be omitted in houses that are fully straw bedded.

In the case of conversions, 50mm extruded polystyrene is acceptable if already in place.

5.4 Walls

Exterior walls shall be of either:-

1) Continuous cavity construction of two 100mm leaves, properly tied by purpose-made ties leaving a 50mm air cavity: top of cavity and openings for windows, doors and air-inlets to be closed in a suitable manner and fitted with vertical D.P.C. Insulation shall be by boards fixed to the inner leaf [30mm extruded polystyrene or 45mm oil-impregnated fiberglass; or, if protected by a vapour barrier on the inner side, 30mm expanded polyurethane or 40mm expanded polystyrene]. The cavity may also be filled with injected ureaformaldehyde foam or with polystyrene beads again protected by a vapour barrier.

Or 2) 225mm cavity block construction, cavities to be closed at wall plates and window ledges. Wall shall be insulated with 40mm extruded polystyrene or, if protected by a vapour barrier, 35mm expanded polyurethane or 50mm expanded polystyrene. All insulation shall be properly protected against any damage.

If mass concrete walls are constructed they shall be insulated to the same level as 1) above.

Wall insulation may be omitted in houses that are fully straw bedded.

In the case of conversions with type 1 walls, the existing levels of insulation may be maintained.

All walls shall be smooth plastered internally to a height of at least 1.3m and be well-pointed, smooth-finished or dashed externally. A damp proof-course shall be fitted not less than 100mm above floor/yard level.

Internal walls shall be of 100mm solid block, plastered both sides to at least 1.3m and fitted with a damp-proof course. When these walls support the roof the floor under them shall be thickened to 225mm. On unfirm ground, the thickened slab shall be reinforced.

Proprietary internal and external wall panels with integral insulation may be used provided that they are designed for at least a 20 year working life. These wall panels shall have a stainless steel skin, or other suitable material that is both chemically resistant and strong enough not to be damaged by sows, for any area that may be in contact with pigs, and be so protected as to prevent rodent damage. The insulation shall at least meet the requirements set out for on-site constructed walls.

5.5 Walls over tanks

Walls shall not be built directly onto slats under any circumstance. Where a wall needs to be built over a tank supporting beams shall be constructed that will rest on the tank walls and/or on 300mm (min.) square concrete piers. The beams shall have at least 150mm support at each end. The beams shall be designed as per S123, clause 8.12 or 8.13. An alternative to the use of walls and beams are the use of movable wall panels.

5.6 Floors

Solid Floors shall be laid smooth with a non-slip finish and be a minimum of 125mm mass concrete. A minimum 150mm hard-core base shall be laid, compacted with vibrating or heavy roller, and topped with fine sand. All floors shall incorporate 1000 gauge polythene DPC membrane with 600mm overlaps laid on the sand under the concrete. The polythene membrane shall be taken up along walls to meet DPC where this has been installed.

Passages for feeding or access shall be level and not lower than the highest point in the dung passage.

Floors may also be slatted over tanks or channels, using concrete slats or slats of other proprietary systems (e.g. galvanized metal, reinforced plastic, etc.) provided the slats conform to the minimum dimensions given in Table 1. See also Clauses 5.11 and 6.1.

Slabs over tanks shall be designed as per Specification S. 123.

Note: Where slats are designed to the dimensions given in Table 1, they shall not be used over the entire floor area, as the required minimum solid area in the designated lying area will not be achieved.

Table 1: Slat rib dimensions for various pigs.

Pig	Minimum rib width	Maximum opening width
Sows and gilts	80 mm	20 mm

5.7 Insulated Floors

Where an insulated floor is required for a lying area it shall be constructed as follows:

A minimum 150mm hard-core base shall be laid, compacted with vibrating or heavy roller, and topped with fine sand. A 100mm layer of concrete shall then be laid onto the hardcore and finished smooth. On top of this a 1000 gauge polythene DPC membrane with 600mm overlaps shall be laid, on top of which the insulation (25mm expanded polyurethane or extruded polystyrene, or 35mm expanded polystyrene) shall be placed. The floor shall be finished with a 50mm layer of concrete finished smooth with a non-slip finish. These floors shall have a fall of 1 in 24 towards a drainage passage.

5.8 Space requirements

Table 2 and Table 3 give the minimum space requirements per pig that shall be provided in all housing. These measurements are internal measurements. This area includes any stalls provided for feeding the pigs. The trough area at the head of any feeding stall shall not be included in this area.

Table 2: Minimum space requirements for sows and served gilts

	Area per Sows	Area per Served Gilt	Minimum pen dimension
5 or less	2.50 m ²	1.81 m ²	2.4 m
Between 6 and 39	2.25 m ²	1.64 m ²	2.8 m
40 or more	2.025 m ²	1.48 m ²	2.8 m

Table 3: Minimum space requirements for other pigs

Average pig weight	Area required
Greater than 110 kg (maiden gilts)	1.40 m ²
Individual boar pen	6.0 m ²
Boar pen used for natural service	10.0 m ²

The shortest side of the pen shall be not less than 2.8m for groups of 6 and over and not less than 2.4m for groups less than 6. Group pens shall not normally be designed for less than 4 pigs (clause 5.1).

5.9 Lying area

Part of the floor space within group pens shall be a designated lying area in the form of a continuous solid floor, with a maximum of 15% of this floor area reserved for drainage openings.

Where individual lying areas are provided for sows/gilts, the divider between the areas should be 1.7m long. One lying area shall be provided for each sow/gilt. A minimum of 80% shall be at least

600mm wide for sows and a maximum of 20% may be 550mm wide for served gilts. There shall be at least 2.0m clear space between the end of the lying area dividers and the opposite side of the pen.

Note: Where slats are designed to the dimensions given in Table 1, they shall not be used over the entire floor area, as the required minimum solid area in the designated lying area will not be achieved.

5.10 Design of Boar pens

Boar pens shall be sited and constructed so as to allow the boar to turn around and to hear, smell and see other pigs, and to provide for clean resting areas. The lying area shall be dry and comfortable. The pen size shall be as given in Table 3. The shortest side of a boar pen shall be not less than 2.0m, and this shall be increased to 2.4m for service pens. Both feed and water facilities shall be provided in every boar pen.

5.11 Sick pens

The shortest side of pens for the isolation of sick, injured or bullied sows and gilts shall be at least 2.0m. Pigs shall not be tethered at any time.

The pens shall be equipped with water and lighting. The lighting provided shall be such that close inspection of the pig can be undertaken at any time. It is recommended that the lighting level be at least 100lux.

5.12 Passages

Main passages for pig movement shall be at least 1000mm wide, however, it is recommended that passages be at least 1200mm wide. Sub passages for maintenance access shall be at least 900mm wide.

5.13 Ventilation of Structure

Ventilation shall ensure that air circulation, dust level, temperature, relative humidity, and gas concentrations are kept within limits not harmful to the pigs.

Ventilation shall be mechanical; natural; or automatically-controlled natural ventilation (ACNV).

The ventilation rate shall be capable of being reduced to such a level so as not to chill the pigs at any time, while still maintaining sufficient air changes.

When designing the ventilation system, care shall be taken to ensure that there are no 'dead-air pockets' within the building.

When mechanical ventilation systems (including ACNV) are used, appropriate back-up systems shall be installed in case of failure. Mechanical ventilation systems shall also be alarmed in case of failure. The alarm shall have a power supply independent of mains electricity. The alarm system shall be tested once a month and maintained in proper working order. An electric generator may be installed when mechanically controlled ventilation is used in case of mains electricity failure. If an electric generator is not installed the ventilation openings shall open to their maximum during a power failure (i.e.: the vents shall be normally open).

Air-inlets shall be automatic or hand-regulated box-type that divert air towards the ceiling, and fitted with a control shutter. Inlets shall not be more than 1.5m from the corners or more than 4m apart; depth of inlet shall be between 75mm and 225mm; distance from ceilings shall be at least 225mm. Where natural ventilation only is used, the total area of inlets shall be twice the area of

chimney or other type of outlet (Tables 4 and 5). With fan extraction, inlets shall be sized appropriate to fan capacity.

Note: If other air-inlet systems are to be used, full details of the system shall be supplied to the Department for approval prior to the start of construction.

Air-outlets shall be designed to one of the following:

- 1) By extractor fans, with speed and thermostatic control, and with overload safety device. Fan shall be of sufficient power to operate against strong winds and rated to give adequate air changes for the house when fully stocked. (Table 4). Fans may be fixed in a wall opening, or in a duct, or flue (chimney) leading out through the roof to finish 450mm above the ridge. The duct or flue may be constructed of timber, PVC, fibre-reinforced board or other suitable material.

Table 4: Fan size

Number of Dry sows, served gilts and boars	x 100 m ³ /hr (Cubic metres per hour)
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Note: Inlet Area = 0.1m² per 1,000 m³/hr fan output.

- 2) By natural ventilation either by controlled openings at high level, or along the ridge, or by flue or duct constructed as outlined above and fitted with a butterfly valve manually operated to control the rate of airflow. For outlet size see Table 5. The top of the flue shall be at least 1.8m above the inlet and covered to prevent rain ingress. The flue may be constructed of timber, PVC, fibre-reinforced board or other suitable material, insulated with 50mm of expanded polystyrene, or equivalent and protected by a vapour barrier. In a mono-pitch house, ventilation may be by a pivoted front vent, manually operated.

Table 5: Flue Size for natural ventilation

Number of Dry sows, served gilts and boars	x 0.012m ²
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Note: Inlet Area = twice the chimney size.

- 3) In the ACNV system, openings shall normally be continuous, or be evenly spaced, along both sides of the house, and flaps (Table 6) shall be close fitting, strongly constructed, and preferably insulated. Ridge outlets with flaps may also be used as part of a designed system, and in monopitch houses front vent flaps are used. Automatic control equipment shall be installed to monitor internal conditions at least once every fifteen minutes, and adjust the flaps as necessary.

Table 6: Inlet area for each side wall for ACNV.

Number of Dry sows, served gilts and boars	x 0.020m ²
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Note: Ridge outlet (if used) shall be half the total inlet flap area.

5.14 Doors

The minimum number of doors necessary for the satisfactory working of the house shall be fitted. Doors shall be ledged, braced, and sheeted, or of other suitable construction, and fitted in rebated frames. **All external doors wider than 1.2m shall be sliding.** Cladding materials for doors shall conform, at least, to the standards specified in S102. No point within the building shall be more than a 45m walking route from an external door.

All external woodwork shall be given at least two coats of lead-free paint.

5.15 Lighting

Natural lighting shall be the normal manner for providing lighting to the house, using doubled glazed windows.

Lighting shall be provided at a minimum light intensity level of 40 lux for a minimum continuous period of eight hours per day. This can be achieved by the use of fluorescent tubes at a rate of 40w per 10m². The lighting shall be provided within the hours 06:00 hrs and 21:00hrs every day to coincide with natural day-light. It is recommended that a time switch, with a recording device to indicate the number of hours that the lights are on, is fitted to ensure that the lighting requirements are achieved. It is recommended that when fluorescent tubes are used that they are installed so that they do not interfere with the air-flow in the house. Lights should be positioned so as to prevent the formation of 'dark corners'.

All windows shall be double-glazed.

Additional lighting shall be provided to enable the close inspection of sows and gilts at any time.

6 Components

6.1 Slats

Concrete slats shall be produced in accordance with IS EN 12737: 2004, and all slats produced after 1st July 2011 shall be CE marked and produced in a plant certified by a Notified body (e.g. NSAI or equivalent), to produce slats to IS EN 12737:2004. The concrete slats shall be load tested and be on the accepted pig slat list. The concrete used in the manufacture of the slats shall be produced in a plant audited to I.S. EN 206-1: 2002 by a certified body accepted by The Department of Agriculture, Fisheries & Food (e.g. N.S.A.I., B.S.I., Q.S.R.M.C).

When laid, slats shall comply with the following requirements:-

- 1) Be free from any cracks, honeycombing, and chipping of the top corner arises.
- 2) **Have a full bearing of at least 75mm at every point of support** (as per Figure 1).
- 3) Finished slat floor shall be level and free from any rocking movement.
- 4) **Be capable of being replaced with minimum disturbance.**

Beams to support slats shall be precast and sourced from the slat supplier. They shall be designed to ensure that at least the minimum bearing is maintained at all times. Beam size may vary with different length slats and various distances between supports. The beams shall be supported as per the manufacturers instructions.

6.2 Pen Dividers

Pen divisions shall be constructed of at least 19mm solid steel bar, or of 100mm block work or mass concrete walls, or of at least 30mm thick proprietary PVC partitions. When divisions are constructed from steel bars, all bars shall be vertical except for the top and bottom bars. Divisions shall be a minimum of 1.2m high. It is recommended that divisions are constructed such that pigs in adjoining pens can see each other. Dividers may either be securely fixed, or hinged to form gates. With individual feeding places there shall be at least 2.0m clear space between the end of the dividers and the opposite pen barrier. When these barriers are constructed of steel bars, the bottom horizontal bar shall be at least 150mm above the floor.

For boar pens the height of divisions shall be at least 1.45m.

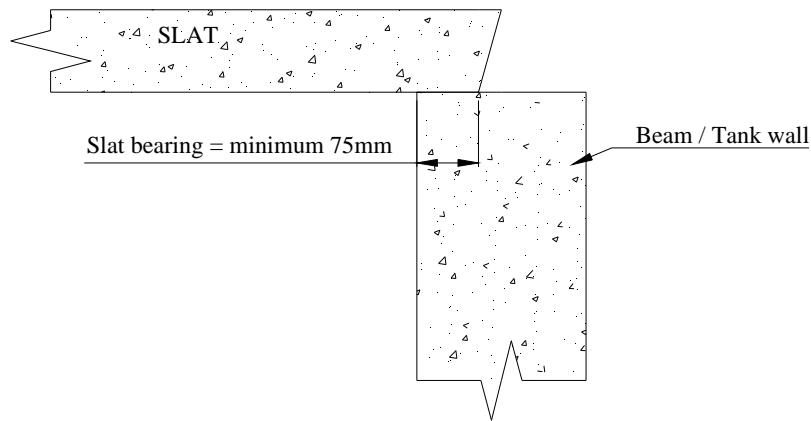


Figure 1: Diagram showing slat bearing.

6.3 Trough design

Troughs shall be constructed of PVC, stainless steel, or other suitable material. Troughs shall be a minimum of 250mm wide and 150mm deep. For individual feeding there shall be at least one space per sow/gilt. Where possible, there shall be a 20mm slot beneath all feed troughs to allow any spills to drain away. Where pigs are feed in their individual lying areas a minimum of 600mm feed space per sow shall be provided, with a minimum of 550mm feed space for gilts. Proprietary feeders are also acceptable. Where dividers between individual trough spaces do not extend more than 300 mm back from the trough, the feed space per pig may be reduced to 450mm.

All troughs shall be supported securely so that sows or gilts cannot damage them, or themselves. Any sharp edges shall be removed prior to pigs having access to troughs.

6.4 Protection and fixing of Pen Divisions, Feed Barriers and Fittings

It is recommended that pen divisions, feed troughs, and access fittings (Clauses 6.2 and 6.3) should be galvanised. Any exposed ungalvanised steel other than structural steel shall be given 3 coats of lead-free anti-rust paint. Timber doors and other timber joinery shall be given a primary coat, 2 undercoats, and a hard gloss finish coat of lead-free paint.

Where pen divisions, barriers, etc., are being fixed to already galvanised or painted stanchions, it is recommended that bolts be used rather than welded connections. Alternatively any welding damage shall be made good as described in the protection of structural steel clause in Specification S101.

6.5 Drinking Arrangements

Dry sow houses shall have at least one drinker per pen. To ensure proper access to fresh water there shall be at least two drinkers in pens with more than nine sows or served gilts. It is strongly recommended that in pens with more than 20 sows there is at least one drinker for every 10 pigs. Bite drinkers shall be mounted at 750mm (fixed bite) to 900mm (adjustable bite) above slats. Water supply shall be via a minimum 19mm pipe located and securely fixed to prevent damage. Sows should ideally get water with their feed allocation.

6.6 Access to Pens

The access to pens shall be controlled by steel door or at least 19mm solid bar gate. All access doors and gates shall be framed and hung to be strong enough to ensure safe stock management and protection of personnel.

7 DESIGN OF TANKS

7.1 General Design

All tanks shall be designed and constructed to the standards as set out in Department Specification 'S. 123: Minimum Specification for Bovine Livestock Units and Reinforced tanks'. Clauses 7.2 to 7.6 below shall apply for tanks under pig buildings in addition to the requirements set out in S. 123.

7.2 Storage capacity

A minimum of 26 weeks storage shall be provided in all new and converted structures in line with the requirements of S.I. 101 of 2009 European Communities (Good Agricultural Practice for Protection of Waters) Regulations and any subsequent amendments to the regulations. However, where the Local Authority has specified a higher winter storage period, then this must be complied with.

Note: The requirements for the capacities of slurry, effluent, and soiled water stores which are defined in S.I. 101 of 2009 Regulations shall be followed. The regulations require that an additional freeboard of 200mm must be provided for all covered tanks and 300mm for all uncovered tanks. A tank covered by slats only is not considered to be covered in respect of allowances for rainfall and freeboard.

7.3 Tanks within Buildings

It is strongly recommended that all tanks be provided with facilities for the full agitation of slurry from point(s) outside the building. This is done by the extension of tanks beyond the building. Under no circumstances shall such extended tanks or access points be roofed over or enclosed. Adequate space shall be provided at all agitation points to ensure that an agitator can be installed into the tank and the tank both fully agitated and emptied.

Access/Agitation points to tanks shall not be installed inside any houses.

It is strongly recommended that full external agitation also be provided for in all designs involving the conversion or extension of existing buildings.

Where an existing building is being extended or converted and there is an internal agitation point, **then this agitation point shall be removed.**

Where agitation points are provided they shall be installed at either end of the tank and in tanks longer than 40m additional agitation points shall be provided half way along the tanks with access from outside only. It is recommended that where agitation points are provided that the tank be deepened, as required, at this point to form a sump that is at least 1.8m deep so as to enable full agitation.

Emptying points shall be provided by using 300mm PVC pipes permanently fixed and extending into a sump in the floor. The sump floor shall be at least 300mm below the main tank floor level. The end of the pipe at the emptying point shall be below the main floor tank level so as to prevent draughts in the building. At least one emptying point shall be provided every 20m along the length of any tank.

7.4 Agitation

The design of the tank at the agitation ends, and the design of the external agitation points, shall suit the chosen systems of agitation and emptying. Manufacturers' specifications and dimensions on guide rails, dividing walls, access chambers etc., shall be followed. Some systems require agitation every 4-6 weeks. [see also Clause 1.4 on safety procedures].

The use of simple aeration systems for the continuous conditioning and mixing of slurry are permitted. These systems shall require prior Departmental acceptance and may be subject to requirements for certificates of guarantee.

7.5 Cover to Extended Tanks

To eliminate draughts and ingress of rainwater all extended tanks shall be covered by reinforced **solid concrete slabs**. All external slabs shall be designed to accommodate at least a 4 tonne dynamic wheel load.

Agitation/emptying points shall be provided by covered access openings within the slabs. Covers in every location shall be manufactured in steel with all elements galvanised to ISO 1461 (1999). Each cover unit shall consist of a frame; a hinged top-cover, either with a lock or safety catch, or with element(s) too heavy for a child to lift; and a separate safety grid underneath, hinged on the same side as the cover and also supported on (at least) the opposite side. The cover shall be hinged to lie back fully when opened, and the safety grid shall lean back at sufficient angle to stay open and be clearly visible in that position. The safety grid of minimum diameter 12mm steel or the equivalent shall have a maximum gap of 125mm between bars with the exception of one or (maximum) two apertures 225mm square, incorporated for slurry extraction.

Covers shall be manufactured to withstand a test load of 40KN [test procedure in accordance with IS EN 124:1994]. It is advised that where an access cover can be subject to heavy wheeled traffic it should be constructed to withstand at least an 80KN load.

7.6 Leak detection system

A leak detection system shall be installed under every new tank constructed for the containment of pig slurry. The leak detection system shall consist of 100mm land drainage pipes distributed in a herringbone pattern under the tank. The greatest distance between two pipes shall not exceed 3 metres. The pipes shall be laid on a slope and connected to an inspection tank, of at least 2.5m³.

8 Certificates

The following certificates shall be collected, and given to the Department before grant-aid can be paid:

- (1) "Concrete" Certificate (Clause 2.1)
- (2) "Electrical" Certificate (Clause 3)
- (3) "Protection of Structural Steel" Certificate (where appropriate)

9 Related Department Specifications

The current edition of the specifications listed below shall also be followed as required:-

- 1) 'S101: Minimum Specification for the Structure of Farm Structures' for all superstructures.
- 2) 'S102: Cladding Materials' for all roof and side cladding.
- 3) 'S123: Minimum Specification for Bovine Livestock Units and Reinforced Concrete Tanks' for all tanks.
- 4) 'S129: Farmyard Drainage'

Copies of these and other relevant Department specifications are available on the department website at: www.agriculture.gov.ie under 'Farm Buildings' or by contacting the one of the local offices of the Department of Agriculture and Food.

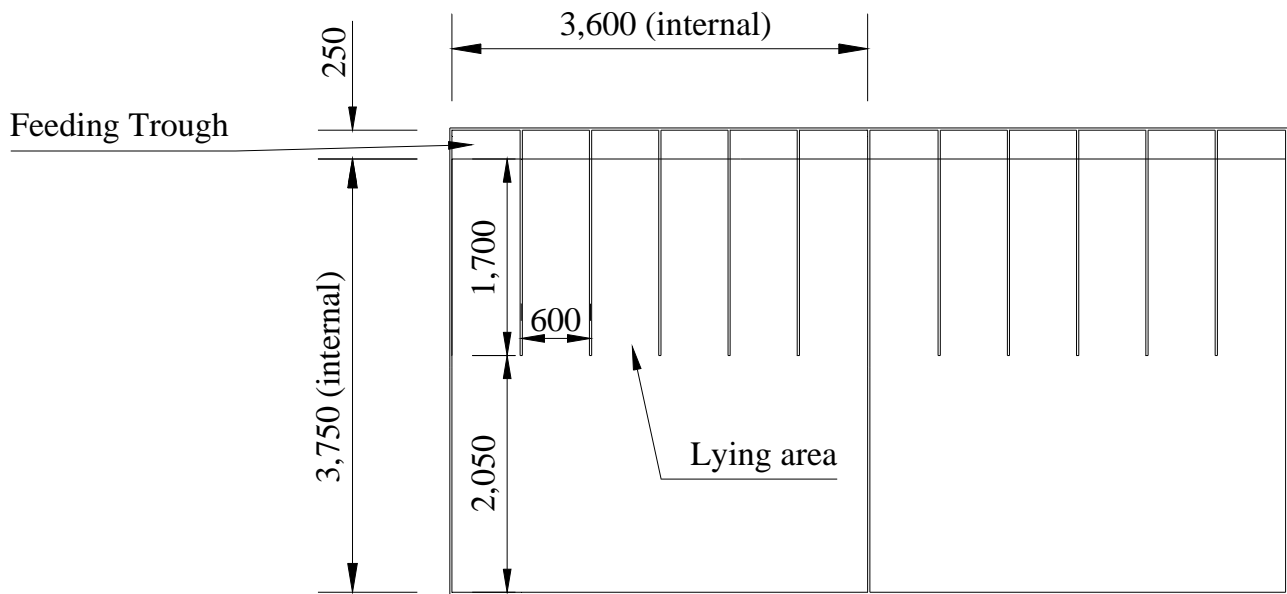


Figure 2: One option for the design and layout of a dry sow pen to meet the new standards.
 [Unobstructed area of pen = 13.5m^2 , required area = 13.5m^2 ($6 \times 2.25\text{m}^2$); Divisions constructed of 19mm diameter solid steel bar; Space of feeding trough is not included in the area of the pen.]