

AN ROINN TALMHAÍOCHTA, BIA AGUS MARA
DEPARTMENT OF AGRICULTURE, FOOD AND THE MARINE

MINIMUM SPECIFICATION FOR THE UPGRADING OF POULTRY HOUSES

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, Food and the Marine.

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, Food and the Marine’s 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 upgrading of poultry houses under the TAMS II Scheme. For the design and construction of a building’s superstructure, Department of Agriculture, Food and the Marine specification ‘S101: Minimum Specifications 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 of Agriculture, Food and the Marine specification ‘S123: Minimum Specification for Bovine Livestock Units and Reinforced tanks’ shall be read and followed alongside this specification. However, if other structural designs are used, 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.

This specification incorporates all of the requirements in S.I. No. 311 of 2010, European Communities (Welfare of Farmed Animals) Regulations, and any subsequent amendment to the Regulations.

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1 Safety

1.1 Responsibility for Safety

Applicants are reminded that they have a duty under the Safety, Health, and Welfare at Work Act 2005 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. It is the applicant's responsibility to provide a construction stage project supervisor.

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: Due to the complex criteria involved, where buildings are proposed within 35 metres of the centre of any overhead power line, the landowner shall contact ESB Networks in advance to ascertain the specific minimum building clearance requirement. It is a requirement on landowners under The Electricity Supply Acts to notify ESB Networks, at least, two months before commencement of any construction works near overhead lines. As a guide, table 1 below sets out the usual minimum clearance distances required, however, ESB Networks shall be contacted and their advice followed for any structure within 35m of the centre line of an overhead power line. ESB will provide landowners with written confirmation of the required clearances. Landowners can contact ESB through phone numbers provided on their electricity bills.

Where building work is undertaken near power lines there is also a safety issue regarding Machinery, Tipper Trucks and Elevators operating without proper safety measures in place. When landowners contact ESB they will be provided with relevant safety literature.

Table 1: In general the following clearances apply to various voltage levels.

Voltage	Clearance
Low Voltage	0.5 to 3 Metres
Medium Voltage	3 to 6 Metres
38KV Lines	10 to 17 Metres
110kv Lines	23 Metres
220KV Lines	30 Metres
400KV Lines	35 Metres

Note:

- ESB overhead lines consist of lines at various voltage levels and require specific safety clearances from buildings depending on voltage level and construction type.
- Clearances are specific to the line voltage, building height, location in line span and ground levels.

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

Roof work: When working on any roof, it is essential to assume that the roof is fragile, unless confirmed otherwise by a competent person.

The HSA Code of Practice for Safety in Roofwork shall be consulted prior to any work being undertaken on a roof. All advice in the code of practice shall be followed.

The HSA code of practice gives recommendations and practical guidance on how to work safely on roofs, including the safe maintenance of roof mounted plant and services, and how to design and plan for safe working. It offers guidance on the design and construction of roofs on new buildings and the maintenance, cleaning and demolition of existing roofs. All work at height poses a risk and a risk assessment should be carried out to assess those risks and put appropriate controls in place.

1.3 Safety Notices

Safety notices shall be placed at the entrance to each of the layer house buildings and shall read the following “AUTHORISED PERSONNEL ONLY”.

A safety notice shall be securely fixed beside every new agitation point for The notice should be as close to the agitation point as possible. A typical agitation point safety notice is shown in Figure 1 below. The sign shall be not less than 490mm wide by 410mm high, and shall be printed on an aluminium alloy board.

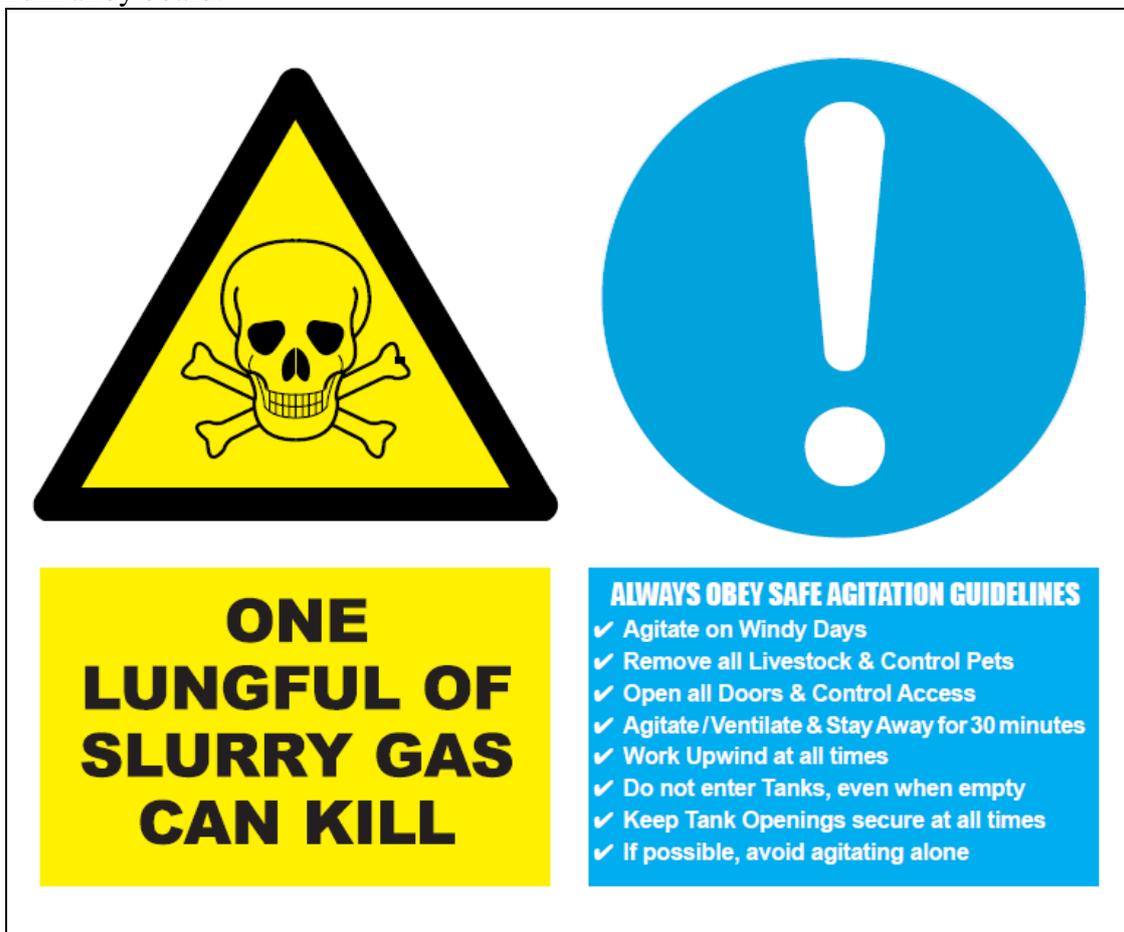


Figure 1: Typical agitation point safety notice.

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. Where silage effluent has been added to the slurry there can be a danger of more concentrated gases. Therefore:

1. Tanks shall always be agitated and/or emptied from the external agitation points, and never from openings within the house.
2. Agitation shall take place on windy days.
3. All animals shall be removed from the house before agitation commences. It is recommended that animal holding pens are installed close to the house to facilitate this removal.
4. All doors, and any feed-flaps, shall be fully opened before agitation/emptying begins and kept open until completion of tank emptying.
5. No person shall enter the house during agitation or emptying.
6. When agitating slurry always work upwind of the tank.
7. 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.
8. Always keep the tank openings secure.
9. If possible avoid agitating alone. Always ensure that someone knows that agitation is being undertaken and the expected completion time.

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, Food and the Marine (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 Food and the Marine for inspection upon completion of the works.

2.2 Curing of Concrete

Concrete produced and supplied is fit for purpose ONLY IF proper curing procedures are adhered to and the structure is not put into service until an adequate curing time (usually a minimum of 28 days) has elapsed. The curing regime shall take account of best practice appropriate to the concrete binder composition and prevailing climatic conditions at time of placing.

All concrete shall be cured by keeping it thoroughly moist for at least seven days. Wetted floor slabs and tank 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, or to silage or silage effluent.

For further information on curing, see the website of the Irish Concrete Society.

2.3 Concrete

For all poultry housing, and slurry tanks under poultry houses, concrete shall be purchased on the basis of a characteristic 28 day cube crushing strength of 37N/mm^2 (strength class C30/37). Minimum cement content shall be 310 kg/m^3 . The maximum water to cement ratio will be 0.55. The specified slump class shall be S2 or S3. The maximum aggregate size shall be 20mm.

The concrete shall be ordered using the appended form for ‘S.100 Mix B’ or by requesting ‘37N concrete with 310kg cement minimum, 0.55 water cement ratio maximum, and slump class S2 or S3, certified to IS EN 206, for use to Specification S.100’.

In the case of exposed yard slabs where freeze/thaw action is a concern, ‘S.100 Mix B’ shall be used with 3.5% minimum air entrainment. Alternatively ‘S.100 Mix A’ may be used.

2.4 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.

2.5 Fibres

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. 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.

2.6 Self-Compacting Concrete

Self-compacting concrete (SCC) may be used in vertical elements only. SCC must comply with all requirements of this specification, except for the slump class which must meet slump flow class SF2. SCC shall be produced by a manufacturer with experience in producing SCC and should be placed by a contractor with experience using SCC.

If it is proposed to use SCC, additional guidance shall be sought by the contractor undertaking the works. Particular care must be taken in the use of fully sealed formwork, designed to withstand the higher hydrostatic pressure exerted by SCC. Guidance can be obtained from the Irish Concrete Society website (www.concrete.ie).

2.7 Materials

Cement and other materials used in the production of concrete shall be in accordance with Department of Agriculture, Food and the Marine specification S.100.

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.

2.8 Tests

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

3 Electrical Installations

Wiring and fittings shall be installed, and all work shall be carried out in accordance with the Fourth Edition of the National Rules for Electrical Installations, ET101:2008 specifically Part 7-705: Requirements for special installations or locations - 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 of Agriculture, Food and the Marine before grant-aid can be finally certified.

3.1 Certificate of installation of mechanical/electrical equipment

The "Certificate of installation of mechanical/electrical equipment" (sample attached in appendix A) may be used during the installation of specialist equipment that is not purely electrical, and whereby it would be impractical to have a registered electrician check the details of all the electrical wiring performed on site. The person performing such installation work shall be trained in the installation of the equipment being installed and certified as such. Examples of the use of this form would be for the installation of the ventilation system.

The power supply for the equipment shall be taken from an isolator that has been installed by a qualified electrician and is of a suitable size for the loading to be placed through it. The "ETCI completion certificate" and the "Supplementary Agricultural Certification Form" shall be completed and signed for the isolator as per clause 12.1 above.

Note that this means that the qualified electrician needs only to certify the electrical installation from the main farm supply, up to and including the isolator to which the installed equipment is connected.

The wording of the certificate shall be as given in the sample certificate attached below, and the certificate shall be on the manufacturer's headed paper.

4 Design of Buildings

4.1 General Design

Building materials used for the construction / upgrading of accommodation, and in particular for the parts of the buildings, with which a bird may come into contact, shall not be harmful to the birds and shall be capable of being thoroughly cleaned and disinfected.

All parts of buildings, equipment, machinery or other utensils that may come into contact with poultry shall be capable of being thoroughly cleansed and disinfected.

The entire floor area of every house shall be of concrete.

Accommodation and fittings shall be constructed and maintained so that there are no sharp edges or protrusions likely to cause injury to the birds.

The building shall be designed so that the sound level is minimised and any constant or sudden noises on the premises avoided.

Ventilation fans, feeding machinery and other equipment shall be constructed, located, operated and maintained in a manner that causes the least possible noise.

Insulation and ventilation control shall be provided to ensure that the temperature is capable of being maintained at a thermally comfortable temperature of between 18^oC and 23^oC for layers and between 18^oC and 23^oC for broilers. In less densely stocked layer houses and for broiler houses heating facilities will be required. Straw bedded houses shall be designed to be thermally comfortable at all times.

Essential Management: All automated or mechanical equipment essential for the health and welfare of the birds 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 birds.

Droppings must be removed as often as necessary and dead laying hens must be removed when found or, at a minimum, once a day.

5 Adequacy of existing Structure

Buildings shall be considered suitable for upgrading **only** when the main structure [floors, walls, roof structure and cladding] are basically sound, or can be brought to specification with a reasonable degree of repair work. An upgraded building is expected to have a full working life of at least twenty years. Seriously inadequate structures should either be demolished or abandoned, and new facilities built instead.

Where it is intended to fully re-roof a poultry building, with the exception of the rafters and stanchions, a full structural review of the building shall be undertaken. This shall include, at least, an analysis of the structural integrity and condition of the building, including a full set of design calculation. The calculations shall also include the loadings applied to the roof structure due to any and all equipment that is supported from the roof (e.g. feed lines and water lines in broiler houses).

5.1 Roof Structure

All new roof elements shall comply with Department of Agriculture, Food and the Marine 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. Where sandwich cladding is used, both sheets of the cladding shall meet the same standard as those 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.

Where the existing roof was clad with painted aluminium cladding sheets, this material may be reused, however, it shall be in good condition, and the existing fixing points shall be reused.

6 Insulation

6.1 Roof Insulation

The roof insulation for free-range housing shall have a U-Value of less than $0.3\text{W/m}^2/\text{°C}$ and for barns, broiler housing and broiler breeders the roof insulation shall have a U-Value of less than $0.2\text{W/m}^2/\text{°C}$. i.e. the lower the U-Value the better the insulating properties.

The level of roof insulation achieved shall be certified by the installer, providing supporting information for the insulation level achieved.

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.

6.2 Wall Insulation

The insulation in the walls of poultry housing shall have a U-Value of less than $0.4\text{W/m}^2/\text{°C}$ and for barns, broiler housing and broiler breeders the wall insulation shall have a U-Value of less than $0.3\text{W/m}^2/\text{°C}$. i.e. the lower the U-Value the better the insulating properties.

The level of wall insulation achieved shall be certified by the installer, providing supporting information for the insulation level achieved.

All walls shall be finished internally so that the birds, insect or rodents cannot damage the insulation. The materials used shall not be harmful to the poultry and shall be capable of being thoroughly cleaned and disinfected.

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 poultry, for any area that may be in contact with birds, and be so protected as to prevent rodent damage. The insulation shall at least meet the requirements as set out above.

6.3 Insulated Doors

Doors for broiler and layer housing shall have a U-Value of less than $0.4\text{W/m}^2/\text{°C}$ and for farrowing houses and weaner accommodation the door insulation shall have a U-Value of less than $0.3\text{W/m}^2/\text{°C}$. i.e. the lower the U-Value the better the insulating properties.

The level of door insulation shall be certified by the installer, providing supporting information for the insulation level achieved.

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.

7 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 birds. In addition the ventilation systems for broiler housing shall be designed so that the concentration of ammonia (NH_3) does not exceed 20 ppm and the concentration of carbon dioxide (CO_2) does not exceed 3000 ppm measured at the level of the chickens' heads. Further the ventilation system shall be designed to ensure that the

average relative humidity measured inside the house during any 48 hours period does not exceed 70% when the outside temperature is below 10°C.

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 birds 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 emergency 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 shall be installed where mechanically controlled ventilation is used, in case of mains electricity failure.

In free range laying hen housing forced ventilation systems should be able to expel at least 5.6m³air/bird/hour and for broiler housing 3.0m³air/kg live-weight of bird/hour.

Table 2. Maximum Ventilation Rates (m³/hr/1,000 birds)

Liveweight (kg)	Laying Birds (1,000)	Broiler Birds (1,000)
2	9,000	
2.5	10,800	
3	12,250	9,000

(1m³/hr=0.588ft³/min)

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 end of the bird area or more than 4m apart; depth of inlet shall be between 75mm and 550mm; distance from ceilings shall be at least 150mm. Where natural ventilation only is used, the total area of inlets shall be twice the area of chimney or other type of outlet 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 of Agriculture, Food and the Marine 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. Fans shall be of sufficient power to operate against strong winds and rated to give adequate air changes for the house when fully stocked. 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.
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. 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 vapor barrier. In a mono-pitch house, ventilation may be by a pivoted front vent, manually operated.

8 Drinker Systems

All watering equipment shall be designed, constructed and placed so that contamination of water and the harmful effects of competition between birds are minimised. All birds shall have equal access to drinking and feeding facilities.

All water pipes shall be manufactured in compliance with IS EN 12201 and be a minimum of PE40. These will either be fully blue or have a blue longitudinal strip.

Please note: - all birds shall have permanent access to a suitable fresh water supply or be able to satisfy its fluid intake needs by other means.

8.1 Drinking Systems for Free-Range Layer Housing

Water shall be provided by either of the following:

- 1) continuous drinking troughs providing at least 2.5 cm per hen or
- 2) one nipple drinker or cup for every ten hens with at least two nipple drinkers or cups are within reach of each hen.

For other poultry, the space provided per bird shall be suitable to the type and size of birds.

8.2 Feeding and Drinking Arrangements for broiler Housing

Water shall be provided by either of the following:

- 1) continuous drinking troughs providing at least 2.5 cm per hen or
- 2) circular troughs providing at least 1 cm per hen or
- 3) one nipple drinker or cup for every ten hens with at least two nipple drinkers or cups are within reach of each hen.

Birds must not have to travel more than 3 m for water within the house. The drinkers should be mounted on a winch system, so that they can be set to the required height for the birds and moved clear for cleaning the house.

For other poultry, the space provided per bird shall be suitable to the type and size of birds.

8.3 Fixed in Water medicine dispenser for poultry unit.

Medicine dispenser shall be installed such that each house can be medicated separately. The medication system shall be of proprietary construction and design for adding medication to drinking water. It is recommended that the system installed can also flush out the drinking lines following the medication of the birds.

9 Water Meters

Water meters shall be installed as per manufacturers' instructions. They shall be installed on so that they are protected from both frost and accidental damage.

Water meters shall be installed so that they water usage in each house may be monitored.

10 Lighting

10.1 Lighting of Broiler Houses

All broiler houses (free-range and barn) shall have lighting with an intensity of at least 20 lux during the lighting period, measured at birds-eye level and illuminating at least 80% of the usable area.

Within seven days of chickens being placed in a building until three days before the anticipated time of slaughter, lighting must follow a 24 hour rhythm and include periods of darkness lasting at least 6 hours, with one period of darkness of at least 4 hours, excluding dimming periods.

- A **time-switch** shall be installed, with a recording device to indicate the number of hours that the lights are on, to ensure that the lighting requirements are achieved.
- Lights should be positioned so as to prevent the formation of ‘dark corners’. Light intensity must be provided in such a way that it is uniform at bird level to encourage even distribution of hens throughout the house and must be capable of being dimmed.
- Lights must be provided in such a way that they are easily cleaned and that dirt is not allowed to build up on them.
- Lighting shall be provided to coincide with natural day-light.
- Adequate lighting (fixed or portable) shall be available to enable the stockperson to thoroughly inspect the birds at all times.
- Additional portable lighting of 100 lux shall be provided to enable close inspection of sick birds.

Lighting shall be provided by energy efficient (LED, etc) lighting once the above criteria are met. As the output of LED lights varies between manufacturers, a light survey shall be undertaken once the lights are installed to ensure that the minimum required lighting levels have been achieved. The survey shall be carried out by the light installer of the lighting system and all light measurement points shall be indicated.

10.2 Lighting of Laying Hen Houses

Sufficient lighting levels shall be provided in all buildings to allow all hens to see one another and be seen clearly, to investigate their surroundings visually and to show normal levels of activity. Where there is natural light, light apertures must be arranged in such a way that light is distributed evenly within the accommodation.

After the first days of conditioning, the lighting regime shall be such as to prevent health and behavioral problems. Accordingly it must follow a 24-hour rhythm and include an adequate uninterrupted period of darkness lasting, by way of indication, about one third of the day, so that the hens may rest and to avoid problems such as immunodepression and ocular anomalies. A period of twilight of sufficient duration ought to be provided when the light is dimmed so that the hens may settle down without disturbance or injury.

- Lighting shall be provided to coincide with natural day-light.
- A **time-switch** shall be installed, with a recording device to indicate the number of hours that the lights are on, to ensure that the lighting requirements are achieved.
- Lights should be positioned so as to prevent the formation of ‘dark corners’. Light intensity must be provided in such a way that it is uniform at bird level to encourage even distribution of hens throughout the house and must be capable of being dimmed.
- Adequate lighting (fixed or portable) shall be available to enable the stockperson to thoroughly inspect the birds at all times.
- Lights must be provided in such a way that they are easily cleaned and that dirt is not allowed to build up on them.
- Additional portable lighting of 100 lux shall be provided to enable close inspection of sick birds.

Lighting shall be provided by energy efficient (LED, etc) lighting once the above criteria are met. As the output of LED lights varies between manufacturers, a light survey shall be undertaken once the lights are installed to ensure that the minimum required lighting levels have been achieved. The survey shall be carried out by the light installer of the lighting system and all light measurement points shall be indicated.

11 Protection of Fixture and Fittings

It is recommended that drinkers and other 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. Doors may be also dried and treated to the Department of Agriculture, Food and the Marine specification S101 - Minimum Specifications for Agricultural Buildings, A5.1.2.

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.

12 Floors of Buildings

12.1 Replacement concrete floor for temperature control.

Hammer-test all suspect and defective areas of concrete. Clearly mark all areas that require removal prior to the start of work. The limits of each area shall be cut as a series of straight lines, using a disc-cutter held at right angles to the surface. Cut out and scabble off all unsound concrete to as constant a depth as possible. The cut-out areas shall be made dust free by air or water jetting, or by rigorous brushing. Each area shall be, at least, 2.0 metres square.

Solid floors for poultry housing shall be of at least 125mm thick mass concrete on at least 150mm hardcore. The floors shall be laid smooth with a non-slip finish. A minimum of 150mm thick 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. Concrete shall be as per clause 2 of this specification.

In cases where fill is purchased for use under concrete, it shall be certified to EN 13242:2013 and meet the requirements of Annex E of S.R. 21: 2015. This material shall also be used as the top 300mm of any backfill around stanchion foundations.

The floor in free-range and barn houses shall have a fall of 1 in 24 towards a drainage passage, except the area under the equipment where the floor shall be level. The entire floor area in caged houses shall be level to accommodate the cages. Suitable drains shall be installed in the floor of caged houses for the removal of soiled water when cleaning. All drainage channels in the floors shall be diverted to the relevant soiled water or effluent tank.

Where required concrete slabs over tanks shall be designed as per the Department of Agriculture, Food and the Marine specification S123 – Minimum Specification for S123 Bovine Livestock Units and Reinforced Tanks.

12.2 Concrete outside pop holes for free range poultry houses.

Concrete aprons outside pop holes for free range housing shall be of at least 125mm thick mass concrete on at least 150mm hardcore. The concrete shall be laid smooth with a non-slip finish. A minimum of 150mm thick 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.

The concrete strip shall extend not less than 1 metre and not more than 1.5metres from the house. The concrete shall slope away from the house to prevent water accumulating. The surface of the concrete shall be no more than 900mm below the bottom of the pop-hole.

In cases where fill is purchased for use under concrete, it shall be certified to EN 13242:2013 and meet the requirements of Annex E of S.R. 21: 2015. This material shall also be used as the top 300mm of any backfill around stanchion foundations.

13 Ancillary Concrete for Poultry Houses

13.1 Preparation of Site

Remove all topsoil and soft material to a minimum depth of 150mm or down to a solid stratum and dispose off site. Lay hardcore and compact in 150mm layers using a suitable vibrating or heavy roller. Consolidation with wheeled or tracked plant is not adequate. The area shall be blinded over with sand or lean mix concrete. Gradients shall correspond to these required in the finished paving. It is recommended that light gauge polythene sheet is placed under the concrete slab.

In cases where fill is purchased for use under concrete, it shall be certified to EN 13242:2013 and meet the requirements of Annex E of S.R. 21: 2015. This material shall also be used as the top 300mm of any backfill around stanchion foundations.

13.2 Thickness of Concrete

Thickness of concrete shall not be less than 125mm at any point. Particular care shall be taken to maintain the thickness under dished channels.

Where concrete paved areas are subject to heavy mechanised traffic, reinforced paving should be provided. The design should meet the requirements of specific loading. In the absence of specific design data A393 mesh to BS 4483 [10mm @ 200mm centres: 6.16kg/m²] shall be placed 40mm below the finished paved surface.

13.3 Placing of Concrete

Strong formwork shall be accurately levelled and fixed to the correct falls for the site and to the predetermined drainage points. Concrete shall be placed in alternate bays not more than 4.5m wide and 6.0m long where there is no fibre additive and not more than 8m long where there is fibre additive. In the case of mesh reinforced paving joint spacing can be extended to 12m by 8m. Alternatively, for larger areas, it is more efficient to lay the concrete in alternate continuous strips 3m to 4m wide with a contraction joint at 5m intervals and in line with joints in adjacent bays, if possible. The contraction point shall be formed by using a 6mm steel bar to press a 100mm wide polythene strip into the freshly laid concrete, see Figures 10 and 11. Expansion joints shall be provided where the area of concrete is large (more than 90m in any direction). A 12mm strip of soft fibreboard extending the full depth of the concrete is suitable for this purpose. On completion the top 20mm of the board should be cut out and the cavity filled with a proprietary expansion joint sealer. Alternatively, a bitumen impregnated fibreboard or the equivalent may be used. Concrete shall be spread uniformly between the forms and compacted with a tamper or vibrating beam. Finish may be either notched or brushed. Concrete shall not be poured under 4°C in a falling thermometer.

14 In-direct Heating Systems

14.1 In-direct heating system

Only proprietary in-direct heating systems shall be used. They shall be installed in strict accordance with the manufacturers' instructions. The system shall be designed so that flue gasses from the boiler cannot enter the same air space as the birds, regardless of level. The system shall normally use a system of radiators which are heated by hot water heated a boiler.

15 Alternative Energy Heating Systems

15.1 Solar panels

Only proprietary solar panels shall be used. They shall be installed in strict accordance with the manufacturers' instructions. The panels shall be permanently fixed to a poultry house or be located alongside the poultry house. The solar panels may be for either the production of hot water or electricity. The hot water or electricity shall only be used in the poultry unit.

15.2 Air source heat pumps

Only proprietary air-source heat pumps shall be used. They shall be installed in strict accordance with the manufacturers' instructions. They shall only be used to heat poultry houses.

15.3 Biomass boiler

Only proprietary bio-mass boilers shall be used. They shall be installed in strict accordance with the manufacturers' instructions. They shall only be used to heat poultry houses.

Biomass is defined as the biodegradable fraction of products, waste and residues of biological origin from agriculture, forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste. As such a biomass boiler can be fuelled with wood chip, wood pellets, wood residue, straw, miscanthus, poultry litter, etc.

15.4 Heat recovery units within building

Only proprietary heat-recovery units shall be used. They shall be installed in strict accordance with the manufacturers' instructions. The recovered heat shall only be used to heat poultry houses.

16 Certificates

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

- (1) "Concrete" Certificate (Clause 2.1)
- (2) "Electrical" Certificate (Clause 3)
- (3) Lighting Survey report (Clause 11)
- (4) Insulation level calculations (Clause 7)

17 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) 'S108: Minimum Specification for manure pits and dungsteeds' for all poultry litter stores.
- 4) 'S123: Minimum Specification for Bovine Livestock Units and Reinforced Concrete Tanks' for all tanks.
- 5) 'S129: Farmyard Drainage'
- 6) 'S.150: Minimum Specification for Laying Hen Houses'

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 your nearest Department office.

[Certificate to be typed on Manufacturers Headed Paper]

CERTIFICATE OF INSTALLATION OF MECHANICAL/ELECTRICAL EQUIPMENT

(This section to be completed by supplier company.)

We the above named company certify that (name of person carrying out installation) has been trained in the installation of (equipment type) and is hereby certified as competent to install the named equipment.

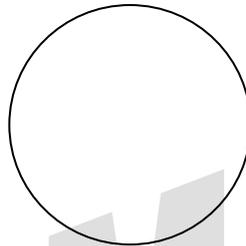
Models: _____

The training was carried out at (location of training) on the dates listed and the named person has been issued with a certificate of competency.

Signed: _____ (Training Instructor)

Date: _____

Company stamp



Dates of training	

(This section to be completed by person performing installation.)

Is there an “ETCI completion certificate” and a “Supplementary Agricultural Certification Form” completed for the electrical isolator to which the electrical connection was made during installation of the above equipment?

I confirm that I installed (Manufacturer’s name, product name and model number)

Name of Client: _____

Address: _____

The installation took place on: _____

Signed: _____ (Person performing installation, as named above.)

Date: _____