

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

**MINIMUM SPECIFICATION FOR TILLAGE MACHINERY**

**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 website ([www.agriculture.gov.ie](http://www.agriculture.gov.ie)) under Building Specifications]. Similarly, references to Standards are to the current edition of the Irish, British or European Standard, as appropriate.

This specification covers the minimum requirements for tillage machinery under the TAMS II grant-aid scheme.

<b>1</b>	<b>SAFETY</b> .....	<b>2</b>
<b>2</b>	<b>GPS MACHINERY CONTROL</b> .....	<b>2</b>
<b>3</b>	<b>SPRAYERS</b> .....	<b>4</b>
<b>4</b>	<b>FERTILIZER SPREADERS</b> .....	<b>5</b>
<b>5</b>	<b>MINIMUM DISTURBANCE TILLAGE</b> .....	<b>6</b>
<b>6</b>	<b>HEAVY CAMBRIDGE ROLLER / FURROW PRESS FOR PESTICIDE REDUCTION.</b>	<b>11</b>
<b>7</b>	<b>GRAIN TREATMENT EQUIPMENT</b> .....	<b>12</b>
<b>8</b>	<b>POTATO HARVESTING</b> .....	<b>12</b>
<b>9</b>	<b>SUITABLE ROAD LIGHTING</b> .....	<b>12</b>
<b>10</b>	<b>WHEEL CHANGING EQUIPMENT</b> .....	<b>13</b>
<b>11</b>	<b>ELECTRICAL INSTALLATION</b> .....	<b>13</b>
<b>12</b>	<b>CERTIFICATES</b> .....	<b>14</b>
<b>13</b>	<b>RELATED DEPARTMENT SPECIFICATIONS</b> .....	<b>14</b>

## **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 Maintenance**

All farm machinery requires regular maintenance to ensure the health and safety of personnel. All machinery should be periodically checked, and all defective items replaced.

## **2 GPS Machinery Control**

### **2.1 Tractor Steering Control**

All GPS control systems shall be of proprietary manufacture. The GPS steering control systems may be fitted to either a new tractor or retrofitted to an existing tractor.

The units shall be able to control the location the tractor to within a distance of 200mm of the intended location. Systems with higher accuracy are permitted. The system shall be able to automatically guide the tractor along the correct path down the field parallel to the previous pass at the required distance. It is not required to be able to turn the tractor on the headland.

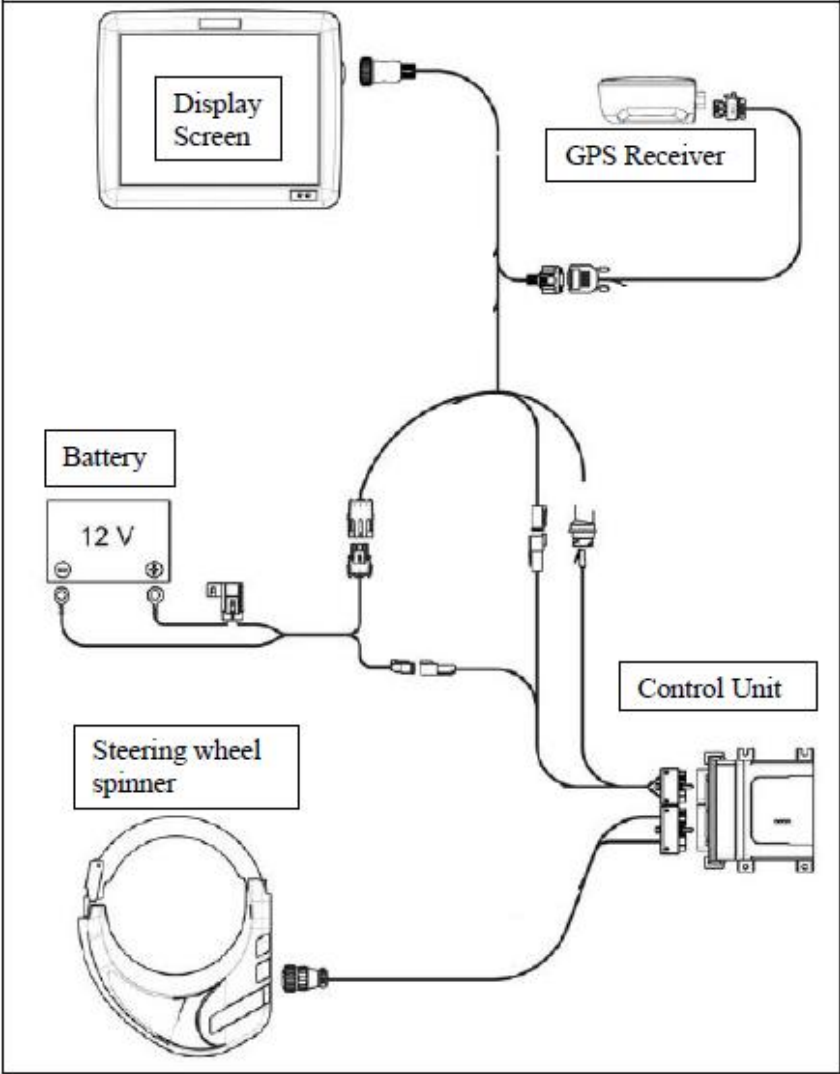
The GPS Steering control unit shall include a display screen, GPS receiver, control unit and tractor steering control. The tractor steering control shall be either a “steering wheel spinner” system or connect directly into the tractors power steering system. Figure 1 shows the components of a steering wheel spinner system.

A steering wheel spinner is a unit that is connected to the steering wheel of the tractor and causes the steering wheel to turn.

For systems connected directly to the power steering system, the steering wheel will not rotate during operation.

The control unit shall be able to record the path of the tractor and be able to link to external devices to upload relevant data, such as the path of the tractor and field details.

Lightbar systems, or systems that do not control a tractor to within 200mm of the intended location are not acceptable for grant-aid.



**Figure 1:** Components of a typical GPS steering control system.

**2.2 Yield Monitors for combine**

All yield monitors for combines shall be of proprietary manufacture. The yield monitor systems may be fitted to either a new combine or retrofitted to an existing combine.

The units shall be able to record the location the combine to within a distance of 200mm of the actual location and record the mass of grain being harvested. Systems with higher accuracy are permitted.

The yield monitor unit shall include a display screen, GPS receiver and control unit.

The control unit shall be able to record the path of the combine, width of cutting head and be able to link to external devices to upload relevant data, such as the path of the combine, field shape and dimensions, crop yield.

**2.3 GPS Standalone Unit**

This is a unit for the control of “GPS Ready” machines or for the tracking of work undertaken by the tractor to which it is fitted. It shall be able to be connected to a machines existing control unit and be able to record the location the machine to within a distance of 200mm of the actual location. Systems with higher accuracy are permitted.

The GPS Standalone Unit shall include a display screen, GPS receiver and control unit.

The control unit shall be able to record the path of the tractor and be able to link to external devices to upload relevant data, such as the path of the tractor and field details.

The GPS Standalone Unit cannot form part of another TAMS II investment i.e. sprayer, fertiliser spreader, tractor steering control or yield monitor.

### **3 Sprayers**

#### **3.1 New Sprayers**

All sprayers shall be fully compliant with the European standard EN ISO 16119-2 and also EN ISO 4254 and shall be fully CE marked. The CE mark shall be shown on the sprayer identification plate.

In addition, all sprayers shall have the following elements:

- Electronic control from within the cab (at minimum it shall control spray pressure, turn on/off individual boom sections, turn on/off the entire boom, adjust boom height, fold / unfold booms and adjust boom level).
- Hydraulic boom height control.
- Wash tank with minimum 10% capacity of main tank.
- Clean water hand wash tank of minimum 15 litre capacity.
- Chemical induction bowl with container wash.
- Internal rinsing nozzle, for cleaning the inside of the spray tank after spraying is completed.
- Minimum of 3 boom segments.
- The actual overall volume of the tank shall exceed the nominal volume by at least 5 %.

All GPS controlled sprayers shall have boom segments not exceeding 3m in length (for non-GPS controlled sprayers the boom segment length shall not exceed 4.5m for boom less than 24m and 6.0 metres for booms of 24m or greater). For sprayers with a boom width greater than 24m, the central two boom sections may be up to 4.5m in length. The GPS system shall be capable of turning individual sections on and off during operation to prevent overlap of spraying. The GPS Unit shall be able to record the path of the sprayer to within 200mm of the actual location, and the control unit shall be able to record and upload information on application rates and locations to external devices.

All self-propelled sprayers shall be GPS controlled.

It is strongly recommended that all sprayers are fitted with triplet nozzle holders and lo-drift nozzles.

All sprayers shall be fitted with suitable road lighting as per clause 9 below.

A front mounted spray tank may be present, however, is not covered by grant-aid.

### 3.2 Full GPS section Control for sprayers – retrofit

This is for the cost of upgrading an existing sprayer to full GPS control. It includes the cost of the GPS unit and upgrading the sprayer control unit. It is not to be added to the cost of a full fertilizer spreader.

All GPS control systems shall be of proprietary manufacture. The GPS system shall be capable of turning individual sections on and off during operation to prevent overlap of spraying. The GPS Unit shall be able to record the path of the sprayer to within 200mm of the actual location, and the control unit shall be able to record and upload information on application rates and locations to external devices.

There is no requirement to upgrade the boom section sizes.

The GPS control units may be fitted to either trailed or mounted sprayers.

The GPS control unit shall include a display screen, GPS receiver, control unit which shall be able to control the sprayer.

## 4 Fertilizer Spreaders

### 4.1 Fertilizer Spreaders

All new fertilizer spreaders shall be GPS controlled. Fertilizer spreaders may be either trailed or mounted. The fertilizer control unit shall be able to control the rate of fertilizer application and the width of spread of the fertilizer to both left and right independently **or have a system that achieves the same effect**. In addition, the system shall control the turning on and off of the fertilizer spreader when approaching and leaving a headland. The unit shall be able to undertake all controls while the fertilizer spreader is in operation in the field.

All fertilizer spreaders shall be fitted with a GPS control unit, weigh cells **or mass metering sensors**, automatic rate control, variable width spreading capability and headland control. The fertilizer spreaders shall have at least 4 nominal applications widths, which can be switched between while in motion.

**All accepted fertilizer spreaders shall be listed on S.195A.**

All GPS control systems shall be of proprietary manufacture. The GPS control unit shall include a display screen, GPS receiver, control unit which shall be able to control the fertilizer spreader. The control unit shall be able to record the location and path of the fertilizer spreader to within a distance of 200mm of the actual location and record the application rate and spreading width across the field. Systems with higher accuracy are permitted. The system shall be able to upload relevant data to external devices so that a record of the fertilizer application rate and location may be made.

Mounted fertilizer spreaders are those that are designed to be mounted directly onto a tractor, even if they are placed on a bogey. They shall have a capacity of between 1,000 litres and 4,500 litres.

Trailed fertilizer spreaders shall specifically designed as trailed machines and shall have a minimum capacity of 5,500 litres.

All fertilizer spreaders shall be fitted with suitable road lighting as per clause 9 below.

### 4.2 GPS for Fertilizer Spreaders

This is for the additional cost of installing full GPS control (section control, headland control, weigh cells **or mass metering sensors** and GPS control unit) to a new fertilizer spreader – it

does not apply to upgrading existing fertilizer spreaders and does not include the cost of the base fertilizer spreader. It is not to be added to the cost of a full fertilizer spreader.

All GPS control systems shall be of proprietary manufacture. The GPS control systems shall be an integral part of the new fertilizer spreader and may be mounted either in the tractor or on the fertilizer spreader. The unit shall be able to control the rate of fertilizer application and the width of spread of the fertilizer to both left and right independently. In addition, the system shall control the turning on and off of the fertilizer spreader when approaching and leaving a headland. The unit shall be able to undertake all controls while the fertilizer spreader is in operation in the field.

The GPS control units may be fitted to either trailed or mounted fertilizer spreaders.

The GPS control unit shall include a display screen, GPS receiver, control unit which shall be able to control the fertilizer spreader. The units shall have at least 4 nominal applications widths, which can be switched between while in motion.

The control unit shall be able to record the location and path of the fertilizer spreader to within a distance of 200mm of the actual location and record the application rate and spreading width across the field. Systems with higher accuracy are permitted. The system shall be able to upload relevant data to external devices so that a record of the fertilizer application rate and location may be made.

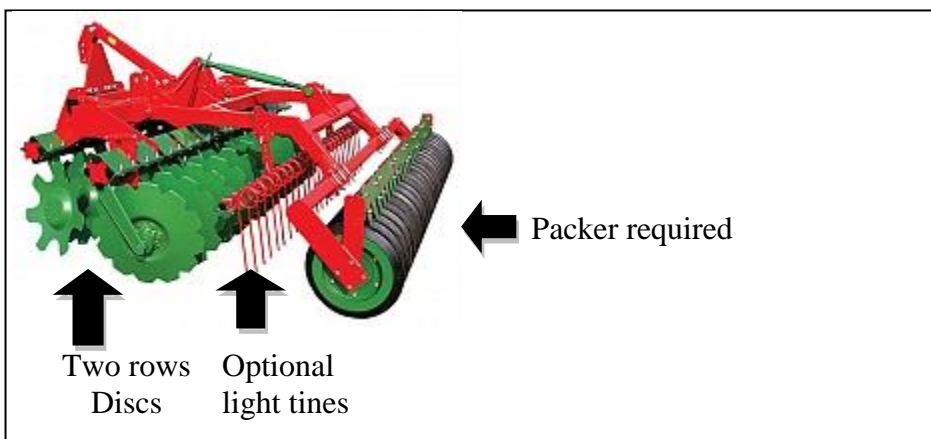
## 5 Minimum disturbance tillage

The use of PTO driven cultivation equipment is not permitted for grant-aid under any aspect of the minimum disturbance tillage investments. In the case of pneumatic drills, the fan may be PTO driven, however, it is recommended that it be hydraulically driven.

Tine and disc cultivators shall be design so that following one pass with the machine the full required cultivation has been completed.

### 5.1 Disc stubble cultivators

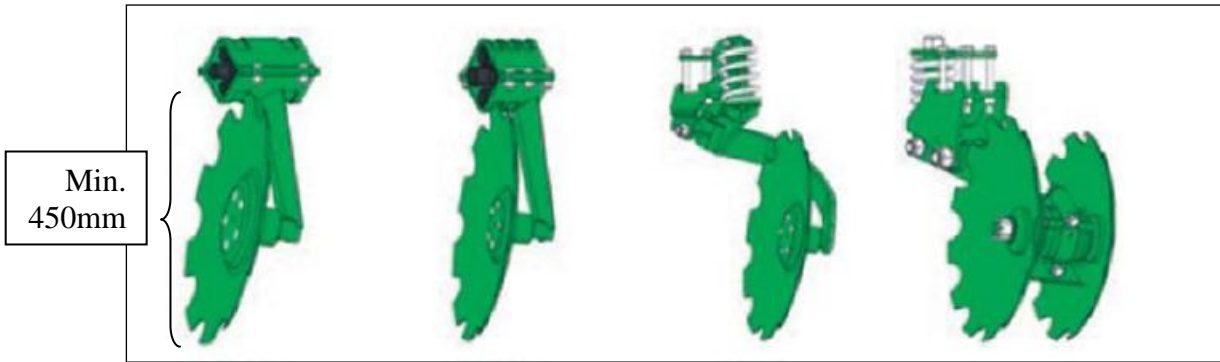
All discs shall be suitable for primary cultivation. Systems designed for secondary cultivation are not permitted. There shall be a minimum of two rows of discs fitted to each machine, with a minimum clearance of 450mm between the underside of the frame and the lowest point of the discs. Each disc stubble cultivator shall be fitted with a packer or cage roller at the back of the machine. A row or two of levelling paddles or light tines may be included on the disc cultivator, as an optional extra.



**Figure 2:** Sample disc cultivator with two rows of heavy discs.

Discs shall be heavy discs capable of deep cultivation. Light discs are not permitted.

The disc stubble cultivators may be either mounted or trailed. All cultivators shall be fitted with suitable road lighting as per clause 9 below.

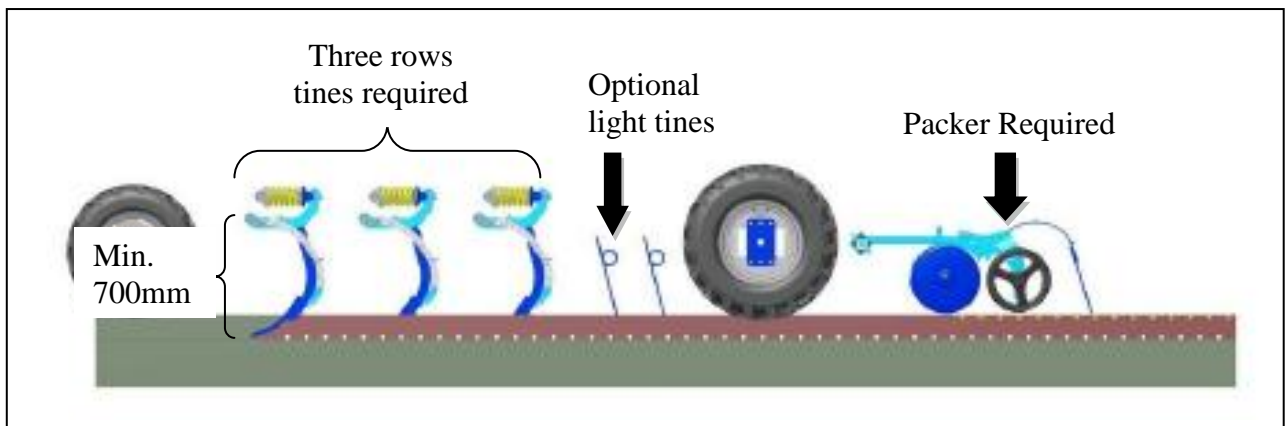


**Figure 3:** Examples of acceptable types of discs.

**5.2 Tine stubble cultivator- Trailed and mounted**

All tines must be suitable for primary cultivation. Systems designed for secondary cultivation are not permitted. Tines shall be heavy tines capable of deep cultivation. Light tines are not permitted. There shall be a minimum of three rows of tines fitted to each machine, with a minimum clearance of 700mm between the underside of the frame and the lowest point of the tines. Each tine stubble cultivator shall be fitted with a packer or cage roller at the back of the machine. A row or two of levelling paddles or light tines may be included on the tine cultivator, as an optional extra.

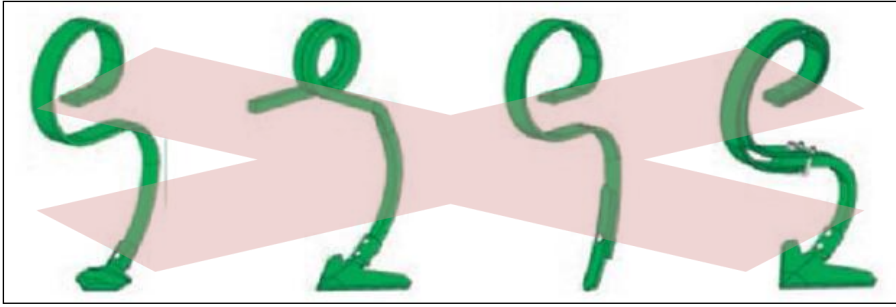
The tine stubble cultivators may be either mounted or trailed. All cultivators shall be fitted with suitable road lighting as per clause 9 below.



**Figure 4:** Example layout and workings of tine cultivator



**Figure 5:** Examples of acceptable types of tines



**Figure 6:** Examples of tines that are not acceptable.

### **5.3 Combined tine and disc cultivator – trailed and mounted**

All discs and tines must be suitable for primary cultivation. Systems designed for secondary cultivation are not permitted. Tines and discs shall be capable of deep cultivation. Light tines or discs are not permitted. The tines and discs shall be the same as for the individual tine or disc cultivators. There shall be a minimum of three rows of discs / tines (min. 2 rows discs and 1 row tines) fitted to each machine, with a minimum clearance of 700mm between the underside of the frame and the lowest point of the tines and a minimum of 450mm clearance between the frame and lowest point of the discs. Each combined tine and disc stubble cultivator shall be fitted with a packer or cage roller at the back of the machine. A row or two of levelling paddles or light tines may be included on the combined tine and disc cultivator, as an optional extra.

Combined Tine and Disc cultivators shall be design so that following one pass with the machine the full required cultivation has been completed.

The tine and disc stubble cultivators may be either mounted or trailed. All cultivators shall be fitted with suitable road lighting as per clause 9 below.

### **5.4 Seed broadcaster to mount on cultivator**

These are to be used to establish green cover following on from primary cultivation. They shall be mounted on a cultivator.

The units must be able to be controlled directly from the cab of the tractor.



**Figure 7:** Example of seed broadcaster with control unit.





**Figure 8:** Example of min till tine and disc drill.

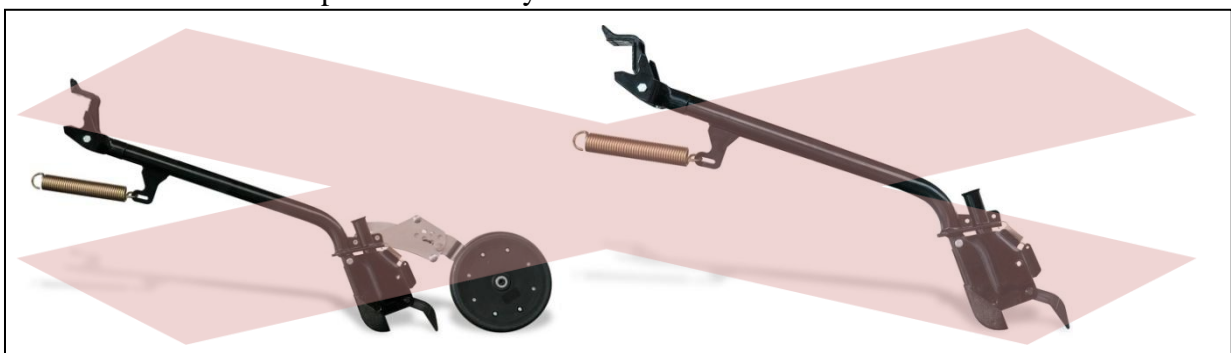
### 5.5 Min till tine and disc drill – trailed and mounted

All discs and tines must be suitable for primary cultivation. Systems designed or secondary cultivation are not permitted. Tines and discs shall be capable of deep cultivation. Light tines or discs are not permitted. The tines and discs shall be the same as for the individual tine or disc cultivators. There shall be a minimum of two rows of tines / discs (min. 2 rows of discs or two rows of tines) fitted to each machine, with a minimum clearance of 700mm between the underside of the frame and the lowest point of the tines and a minimum of 450mm clearance between the frame and lowest point of the discs. Each min till tine and disc drill shall be fitted with a packer or cage roller at the back of the machine. A row of levelling paddles or light tines may be included on the min till drill, as an optional extra.

Combined Tine and Disc drills shall be design so that following one pass with the machine the full required cultivation has been completed.

The min till tine and disc drill may be either mounted or trailed. All drills shall be fitted with suitable road lighting as per clause 9 below.

Suffolk coulters are not permitted on any seed drill for direct drill work.



**Figure 9:** Examples of Suffolk coulters that are not permitted

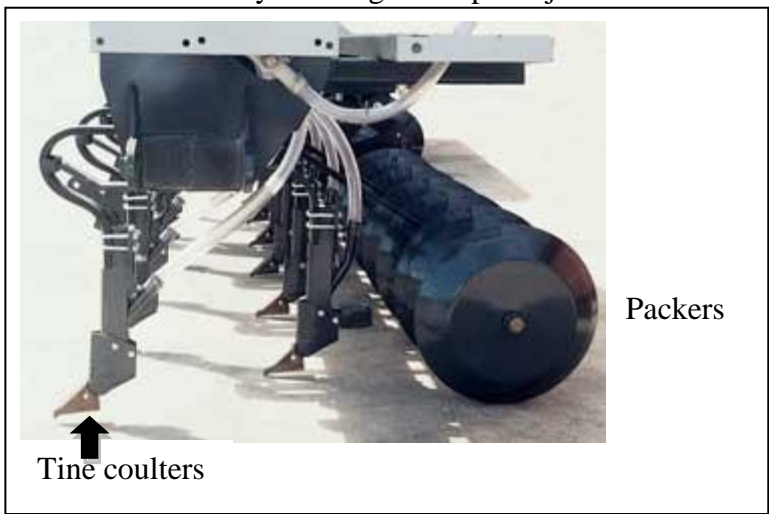
The min till tine and disc drill may be designed to place just seed or seed and fertilizer into the seed bed.

### 5.6 Direct drill

Direct drills shall be designed to place seed into the soil causing minimum disturbance to the soil surface. There shall be a minimum clearance of 450mm between the underside of the frame and the lowest point of the tine coulters and a minimum of 450mm clearance between the frame and lowest point of the disc coulters. The seed shall be placed by the tine or disc that is used to open the soil. It is not permitted to have both a line of tine or discs and a line of separate coulters. Each direct drill shall be fitted with a packer at the back of the machine to compact the soil around the seed – the packer is not required to be continuous, and may be designed to run individually behind each coulters.

All direct drills shall be fitted with suitable road lighting as per clause 9 below.

The direct drill may be designed to place just seed or seed and fertilizer into the seed bed.



**Figure 10:** Example of a direct drill

### 5.7 Strip till drill

Strip till drills shall be designed to cultivate only the narrow strip of soil where the seed is to be placed.



**Figure 11:** Example of a strip till drill

There shall be a minimum clearance of 450mm between the underside of the frame and the lowest point of the tine coulters. Each strip till drill shall be fitted with a packer at the back

of the machine to compact the soil around the seed – the packer is not required to be continuous, and may be designed to run individually behind each coulter.

All strip till drills shall be fitted with suitable road lighting as per clause 9 below.

Suffolk coulters are not permitted on any seed drill for strip till work.

The strip till drill may be designed to place just seed or seed and fertilizer into the seed bed.

## **6 Heavy Cambridge Roller / furrow press for Pesticide reduction**

All rollers shall be of steel or cast iron rings, designed to compact the seedbed in order to control leather jackets. All rings in both furrow presses and Cambridge rollers shall be a minimum of 500mm diameter. A row of levelling paddles or light tines may be included on the Cambridge roller / furrow press, as an optional extra.

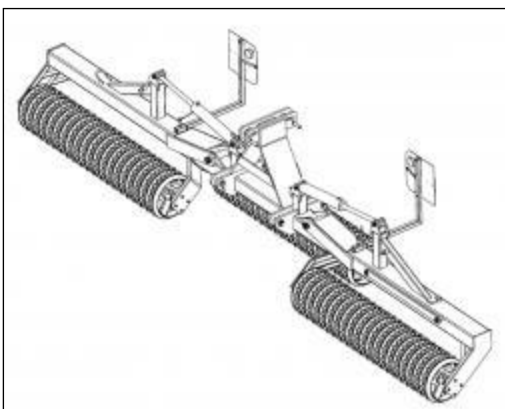
Both heavy Cambridge rollers and furrow presses are acceptable for grant-aid. The furrow press may be either tractor mounted or trailed from a plough.

All Cambridge rollers shall be designed to be directly towed by / mounted on a tractor. Cambridge rollers that are designed to be connected to the back of a stubble cultivator shall also be capable of being towed by / mounted on a tractor.

All Cambridge rollers shall be fitted with suitable road lighting as per clause 9 below.



**Figure 12:** Example of a furrow press



**Figure 13:** Example of a Cambridge roller

## **7 Grain treatment Equipment**

### **7.1 Grain mill (roller/crimper)**

Grain mills may be either fixed or mobile and shall be designed to roll or crimp grain. Each mill shall consist of an intake hopper, roller / crimper and discharge auger.

Grain mills may be either electrically powered or driven directly from a tractor PTO.

### **7.2 Liquid treatment applicator**

The liquid applicator shall be attached to a grain mill and apply the liquid treatment immediately after rolling of the grain. The system shall be designed to thoroughly mix the liquid and grain. The system shall include a meter to record the rate of application of the liquid to the grain.

### **7.3 Powder treatment applicator**

The powder applicator shall be attached to a grain mill and apply the powder treatment immediately after rolling of the grain. The system shall be designed to thoroughly mix the powder and grain.

### **7.4 Grain elevator / augers (not for grain dryers)**

These may be either fixed or mobile, and shall be electrically driven. The electrical wiring of fixed elevators / conveyors shall be certified in accordance with clause 10.

## **8 Potato Harvesting**

Only webs and separator segments / dolmens suitable for lifting salad potatoes shall be grant-aided.

For all webs the maximum spacing between the centres of the bars shall not exceed 35mm and the bars in the webs shall be at least 10mm diameter. The webs shall be for either single row or 2 row harvesters. All webs shall be of proprietary manufacture.

Separator segments / dolmens – these may be spiral or plain. They shall be sized and spaced to retain salad potatoes. All separator segments / dolmens shall be of proprietary manufacture.

## **9 Suitable road lighting**

All trailed equipment being grant-aided shall be fitted with full lighting systems, including side lamps, rear lamps, stop lamps, indicators and number plate lighting. The lighting may be provided by a fixed lighting board on the machine. The lighting is required at all times and not only during lighting up hours.

All trailed equipment shall also be fitted with a marker lamp on their right hand side if, when coupled to an agricultural tractor, the overall length of the combination is more than 10 metres.

All mounted equipment that blocks the lighting and reflectors on the tractor to which they will be mounted shall be equipped with full lighting systems as set out above.

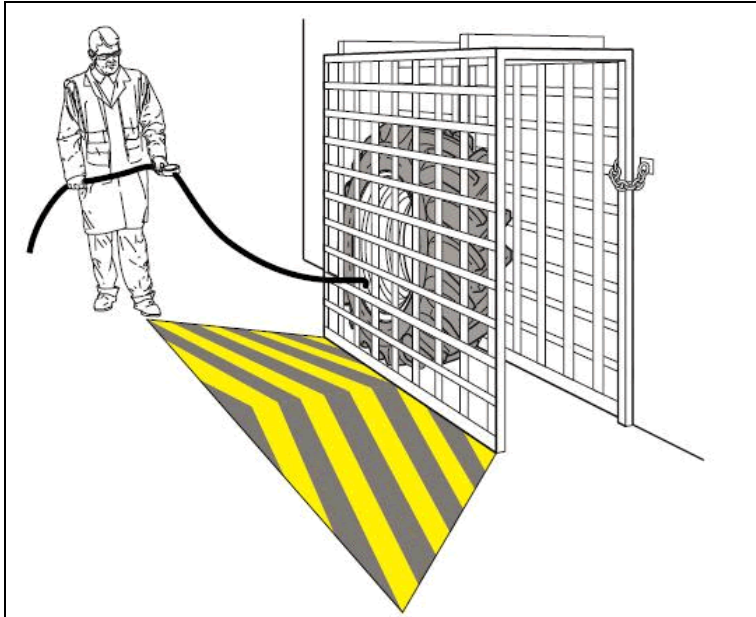
## **10 Wheel Changing Equipment**

### **10.1 Wheel changing crate**

This is a crate for lifting a wheel to remove / replace onto an axle. The system shall be designed to securely hold the wheel, and remove the need for manual lifting. The system shall be adjustable so that it can move a range of wheel sizes.

### **10.2 Wheel pumping crate - manual pumping**

This is a cage into which a wheel may be placed for inflation. The cage shall be a steel frame and suitably sized for the tyres that need to be inflated. Doors at the ends are optional.



**Figure 14:** Example of a manual wheel pumping crate.

### **10.3 Wheel pumping crate - fully automatic**

This is a cage into which a wheel may be placed for inflation. The cage shall be a steel frame and suitably sized for the tyres that need to be inflated. The cage shall have doors at both ends and be covered over the top. It shall be designed so that a wheel may be rolled into and out of the cage.

The unit shall be fitted with a control system that will enable the automatic inflation of the tyres to the required pressure. The control system shall be designed so that it inflates the tyre in stages to give time for the pressure in the tyre to equalize. The fittings on the unit shall be designed so that the operator does not need to remain in the area of the cage during the inflation of the tyre.

The electrical wiring of automatic wheel pumping crates shall be certified in accordance with clause 10.

## **11 ELECTRICAL INSTALLATION**

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.

## **12 Certificates**

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

“Electrical” Certificate (Clause 10)

## **13 Related Department Specifications**

Copies of other relevant Department specifications are available on the department website at: [www.agriculture.gov.ie](http://www.agriculture.gov.ie) under ‘Building Specifications’ or by contacting the one of the local offices of the Department of Agriculture, Food and the Marine.

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Clauses modified: 4.1, 4.2.