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POST DRIVERS

INDUSTRY SAFETY STANDARD

MAY 2009











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1. INTRODUCTION

The Industry Solutions Program is a research and development initiative undertaken by WorkCover NSW, which has worked with industry to devise practical solutions to problematic issues in an industry. It recognises the need for assistance in some industry sectors to overcome particular difficulties or challenges in order to improve workplace safety.

Solutions to safety issues are developed in partnership with industry within a three month period and then released for industry-wide implementation. Within 12 months an evaluation is conducted jointly with industry to determine the effectiveness and practicality of the solutions. If necessary, further refinements, including additional solutions, are included after the evaluation.

The Industry Solutions Program identified that post drivers are a potentially hazardous item of plant and there was no practical guidance available on their design and use – hence this industry safety standard was developed and published in April 2007. A review of the standard was completed in September 2008.

Contributors to this industry safety standard include:

- Australian Workers Union
- Daken Farm Equipment
- Farmsafe Australia Inc
- Kentan Machinery Pty Ltd (FIMDA)
- Lyco Innovations Pty Ltd
- Motor Traders' Association NSW
- NSW Farmers Association
- Online Safety Systems
- Tractor Machinery Association of Australia.

This industry safety standard provides practical assistance for designers, manufacturers, suppliers and users of post drivers. Occupational health and safety regulations require the control of risk to health and safety, and following this industry safety standard is a means to achieve such compliance.

1.1 ENDORSEMENT

This industry safety standard has been reviewed and endorsed by:

- Workplace Health and Safety Queensland
- WorkSafe Victoria
- WorkSafe Western Australia.

1.2 STATE OHS LEGISLATION

For specific occupational health and safety (OHS) state requirements, refer to:

New South Wales

- Occupational Health and Safety Act 2000
- Occupational Health and Safety Regulation 2001

Queensland

- Workplace Health and Safety Act 1995
- Workplace Health and Safety Regulation 2008
- Electrical Safety Act 2002
- Electrical Safety Regulation 2002

Note: Users of post drivers are urged to adopt and develop safe systems of work as specified in section 7.

Victoria

- Occupational Health and Safety Act 2004
- Occupational Health and Safety Regulations 2007

Western Australia

- · Occupational Safety and Health Act 1984
- Occupational Safety and Health Regulations 1986

To contact your OHS state authority, refer to appendix C.

2. SCOPE

This industry safety standard covers all new power-driven post drivers, including those with integrated hydraulic earth auger systems driven by a tractor, or by other means.

This industry safety standard also covers all used post drivers for resale.

3. DEFINITIONS

competent person for any task means a person who has acquired through training,

qualifications or experience, or a combination of them, the knowledge

and skills to carry out that task.

hammer (or dolly) the component of the post driver that drives the post into the ground.

hostile operating environment

an operating environment at a place of work where an item of electrical equipment is in its normal use subject to operating conditions that are likely to result in damage to the item of equipment.

This includes an operating environment that may:

· cause mechanical damage to the equipment, or

 expose the equipment to moisture, heat, vibration, corrosive substances or dust that is likely to result in damage to the equipment.

must indicates that the requirements are mandatory under OHS legislation.

owner the person who possesses the post driver for their own or another

person's use.

Note: In this industry safety standard, the owner is usually the person

designated the employer under OHS legislation.

should indicates a recommendation to do something that is not a mandatory

requirement under OHS legislation.

supplier includes dealers, retailers and importers.

4. DESIGN

4.1 GUARDING

4.1.1 General

Effective guards must be used to prevent access by the operator to moving and other dangerous parts of the post driver while it is in operation. The guards must prevent access by the operator, persons assisting in the post driving operation and others in the vicinity. They must be designed as an integral part of the post driver.

The hammer must be guarded to a height of 2.4 m from ground level and extend at least 300 mm below the bottom of the hammer's drop height. For post drivers designed to drive posts their entire length into the ground, guards must be no more than 300 mm above ground level and at least 300 mm from the faces of the hammer.

Note: Additional means may be required to protect the operator from impact from particles ejected during the operation. Such means may be a separate guard at the operator's position or a hammer that encloses the top of the post.

All guards must be secured in position so they cannot be removed without the use of tools, unless:

- an interlocking device is provided to prevent the post driver operating and to automatically stop it should the guards be removed or opened
- the drop speed of the hammer is restricted to a maximum of 1 m in 10 seconds (100 mm/second) while the guard is opened.

Note: It may be necessary to use the hammer to position a post at the start of the operation, or reposition it during the operation, which requires the guard to be temporarily displaced. In such instances, the speed of the hammer must be restricted.

Other nip, shear and crush points – eg positional controls, hinged guards – should be designed to prevent shearing and crushing. This may be through guarding or controlling the speed of movement or operation – eg tilts at a maximum 10 °/second, side shift 100 mm/second.

4.1.2 Post drivers for use with existing fences

Post drivers intended for replacing posts in existing fences need to be used without damaging the fence. One option is to have a guard comprising horizontal bars only. In such cases, the bars must be rigid (eg steel not less than 25 mm diameter) and be spaced vertically no more than 150 mm apart and a minimum of 300 mm from the outer face/point and sides of the hammer.

For guards comprising fixed horizontal bars, a vertical gap may be incorporated in the front of the guard to facilitate positioning of the post and enable the post driver to be withdrawn following the operation. Such a gap must be no more than 250 mm wide.

Where such a guard is used, the requirements and conditions specified in section 4.1.1 Guarding (General) must be maintained. In addition, a guard must be provided at the operating position to protect the operator from particles that may be ejected from the post during the driving operation and to prevent the operator from reaching the post when standing in the normal operating position. This form of guarding must not be used for automatic post drivers.

4.1.3 Drive belts, pulleys, chains, sprockets and drive shafts

All drive belts, pulleys, chains, sprockets and drive shafts must be fully guarded, including 'back guarding', to prevent contact from behind.

Chains and sprockets must be fully enclosed for their whole length.

4.1.4 Wire ropes

For winch-activated post drivers, guards should be provided to prevent physical contact with the nip points between the ropes and sheaves. Means should be provided to prevent ropes from becoming displaced from sheaves.

4.2 CONTROLS AND EMERGENCY STOPS

All controls on the post driver must be clearly and permanently identified.

Except for post drivers with an automatic hammer cycling operation, actuating switches or levers on hydraulic or pneumatic post drivers should be shrouded to prevent accidental activation or be of the hold to run (ie 'deadman') type, which automatically returns to the neutral or off position when released.

The direction of movement of the controls should follow the direction of movement of the assigned function. The up/down lever must be orientated differently from the other levers.

Automatic post drivers must be fitted with an emergency stop button fitted at the control station.

Self-powered post drivers – ie those that do not take their motive power from a tractor or other source – must be fitted with a master switch that must be activated and remain in the 'on' position for the post driver to operate. The master switch must be capable of being disengaged and either removed from the post driver or locked in the 'off' position.

4.3 POWER WINCHES

Winches must comply with Australian Standard AS 1418 *Cranes, hoists and winches,* Part 1: *General requirements* and Part 2: *Serial hoists and winches,* including design of integral wire ropes, sheaves and drums. Wire ropes used for raising the hammer should be fastened using swaged, socketed or spliced eyes and thimbles. Wire ropes, when used in this application, must not be fastened by using rope grips, such as bulldog grips, or knots.

Some key features in AS 1418.2 relating to power operated wire rope hoists are:

- Guards must be provided to prevent a hand being caught between the wire rope and the wire rope sheave(s).
- If there is a possibility of the rope being dislodged from the sheave eg when the rope is not continually under load the sheave must be provided with means to retain the rope in the groove.

• The rope angle should not exceed 45 degrees (see figure 1).

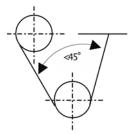


Figure 1 - Rope angle

- Wire ropes must comply with Australian Standard AS 3569 *Steel wire ropes* or an equivalent international standard.
- Lang's lay ropes other than non-rotating ropes must not be used.
- A device must be provided to ensure that the wire rope is correctly wound on the drum.
- All rope end fastening devices used for wire rope must have a safety factor of five or more including the effect of rope friction – where rope friction is taken into account, a friction coefficient of 0.1 applies.
- The drum and sheave diameter depends upon the classification of the hoist as a minimum, the drum diameter cannot be less than 11.2 times the diameter of the rope, the sheave diameter cannot be less than 12.5 times the diameter of the rope, and the rope equaliser sheave diameter cannot be less than 11.2 times the diameter of the rope.
- Top and bottom limits must be fitted where necessary.

4.4 STABILITY

The post driver must remain stable during travel and use. The designer must specify the essential features that affect the post driver's stability during use, in particular its weight.

Note: There are numerous variables that can affect the stability of a post driver that are outside the control of the designer and can only be determined by its user. These include the type of tractor to which the post driver is attached, the type of ground on which it is operating, the slope of the ground where it is being used or transported over, and the driven speed of the tractor.

The post driver should be designed so that it can be transported with the hammer in its lowered position.

The design of the post driver should incorporate means for allowing the post driver to be stored in a stable position.

4.5 GUIDING THE POST

Except for those post drivers designed to operate on low speed for the purposes of positioning the post (see section 4.1.1), post drivers should incorporate means to secure the post, or other item being driven, in the upright position. This is to avoid the operator or another person having to support and guide the post during the driving operation.

4.6 HYDRAULIC SYSTEMS

All hydraulic hoses must have a safety factor of 4:1 of the minimum burst pressure of the hose to the maximum dynamic working pressure.

4.7 ELECTRICAL SAFETY

An electrically-powered post driver should be designed and manufactured in accordance with Australian/New Zealand Standard AS/NZS 3100 *Approval and test specification – General requirements for electrical safety.*

Overload protection should be provided for electric winches fitted to the post driver.

Portable electrically-powered post drivers should be protected by a 30 mA residual current device at the power outlet.

If an electrically-powered post driver is used in a 'hostile operating environment' it must be regularly inspected and tested by a competent person. Guidance on inspection and testing methods can be found in the Australian/New Zealand Standard AS/NZS 3760 *In-service* safety inspection and testing of electrical equipment.

Note: Due to the nature of a post driver operation it is likely that a risk assessment would determine that it is operating in a hostile operating environment and therefore would require regular inspection and testing.

Where the post driver is permanently connected to an electrical installation it must be wired in accordance with the Australian/New Zealand Standard AS/NZS 3000 *Electrical installations* (known as the Australian/New Zealand Wiring rules).

4.8 SAFETY SIGNS

Every post driver must clearly display, on the operator's side and opposite side of the machine, pictorial and written signs warning against the serious safety risks outlined in this industry safety standard. The signs should include the following warnings:

- Keep post driver clear of overhead powerlines.
- Do not operate post driver with the guards removed.
- Keep post driver clear of underground services.

Examples are provided in appendix A.

Where possible, information should be represented by symbols that conform to Australian Standard AS 1319 *Safety signs for the occupational environment.* All words should be in English and units should be metric.

The hammer should be painted yellow to indicate danger. Refer to Australian Standard AS 1318. *Use of colour for the marking of physical hazards and the identification of certain equipment in industry* (known as the SAA Industrial safety colour code).

4.9 RETENTION OF INSTRUCTIONS

The post driver must include a weatherproof receptacle in which to store the operating instructions in good condition. The receptacle must be labelled accordingly.

5. MANUFACTURER

5.1 MANUFACTURER'S RESPONSIBILITIES

The manufacturer must ensure that the post driver is manufactured in accordance with the design specifications.

The manufacturer's identification details and model number must be clearly and permanently marked on the main body of the post driver.

5.2 MANUFACTURER'S INSTRUCTIONS

The manufacturer must develop instructions that clearly specify all the information necessary to ensure the safe use of the post driver, including all limitations on its use, and an inspection and maintenance schedule.

The instructions should include as a minimum:

- the means for attaching and detaching the post driver to and from the tractor
- means for safe storage and transport of the post driver
- safe operating instructions
- a warning about overhead powerlines and underground services
- necessary personal protective equipment
- tractor specifications that are necessary for the safe operation and transport of the post driver – eg mass, width of wheel track, category of linkage
- details of the inspection and maintenance requirements for separate items and components, and the post driver as a whole, including a pre-operational checklist
- advice that when the post driver is not in operation, it must be immobilised eg turned off and key removed from power source
- advice on the use of guards.

The manufacturer should provide practical means for communicating the operating instructions. Such means may include an instruction video or DVD, or an instruction package.

6. SUPPLIER

6.1 GENERAL

The supplier should ensure that the post driver complies with this industry safety standard or an equivalent level of safety. The supplier should ensure the checklist items at appendix B are addressed.

6.2 PROVISION OF INFORMATION

The manufacturer's instructions and all other information relevant to the safe use of the post driver must be provided at its point of supply. For post drivers imported either from another country or from another state or territory, the supplier must still ensure that the manufacturer's instructions are available.

6.3 OBTAINING INFORMATION

The supplier should obtain information from the prospective purchaser and compare this with the specifications provided by the manufacturer, to ensure the most appropriate post driver is supplied. Such information should include the type of fencing to be undertaken, the type of tractor the purchaser has, and the type of land and terrain on which the post driver will be used and travelled.

6.4 PRACTICAL SAFETY INFORMATION

The supplier should establish a means to instruct persons purchasing post drivers in their safe operation.

Note: Such means may include a video or DVD, an instruction session, or an explanation of the manufacturer's safety instructions.

7. USE

7.1 PRE-PURCHASE

The purchaser of the post driver should discuss their needs with the supplier prior to purchase to ensure the post driver is the most appropriate for their needs (see section 6.3). The supplier must ensure the manufacturer's instructions are available at the point of purchase.

The purchaser should also seek practical advice and instruction from the supplier on the use of the post driver.

Note: When a person is taking possession of the post driver on a temporary basis – eg by way of loan – they should seek safe use instructions from the person supplying it.

7.2 SAFETY INSTRUCTIONS

The owner must provide safety instructions to all persons involved in using the post driver. The safety instructions must be kept with the post driver in the receptacle provided for that purpose.

Note: The safety instructions should generally be the manufacturer's instructions. Variations from the manufacturer's instructions must be based on a risk assessment, must not remove any of the safety features and must not expose persons to risks.

7.3 COMPETENCE

The owner must ensure that persons operating the post driver, and those otherwise involved in its operation, are competent to do so. All persons involved in the operation of the post driver must be instructed in the safety instructions.

7.4 USE

The post driver must be used in accordance with the safety instructions (see note in section 7.2).

Prior to use, the post driver should be inspected to ensure it is functioning correctly, including all its safety features, such as guards. If any safety feature is not functioning correctly, the post driver must not be used.

The area where the post driver is to operate must be assessed for hazards that may affect the operation, including the location of overhead powerlines and underground services, and the terrain where the post driver will be used.

Except for those post drivers designed to operate at restricted speed – ie the drop-speed of the hammer is restricted to a maximum of 1 m per 10 seconds (see section 4.1.1) – the operator or other person(s) must not support and guide the post during the driving operation.

When operating a post driver near overhead powerlines, it is essential to maintain the following approach distances:

- 3 m up to and including 132,000 volts
- 6 m above 132,000 volts up to and including 330,000 volts
- 8 m above 330,000 volts.

Note: Regulatory jurisdictions have different approach (or separation) distances for work in close proximity to overhead power lines. The distances above apply for NSW. Refer to your OHS or electrical regulator for the relevant distances in your jurisdiction.

These clearances must allow for the sagging or swinging of the power lines due to their expansion or the effects of wind.

The post driver must remain stable during travel and use and must not exceed the tractor manufacturer specifications. The tractor to which the post driver is attached must have sufficient lifting capacity to safely handle the post driver, both for transportation and operation.

7.5 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The owner must provide appropriate PPE to persons involved in the post driving operation. Hearing and eye protection must be provided.

7.6 DEACTIVATING THE POST DRIVER

When the post driver is not being used, it must be immobilised. Either the post driver (for self-powered machines) or the power source (eg tractor) must be switched off and the activation switch immobilised, or the key removed. When the post driver is immobilised, the hammer must be placed in its lowest position.

7.7 STORAGE AND TRANSPORT

When not being used, the post driver must be safely stored in accordance with the manufacturer's instructions. Particular care should be given to ensure it is stable and does not pose a risk of falling onto a person who is preparing it for use, or falling onto a person accidentally.

When the post driver is being transported while attached to a tractor or carried on a truck:

- it should be configured and secured in accordance with the manufacturer's instructions
- along a public road, all road regulations, including height restrictions, must be observed
- the hammer should be in its lowest position
- across a farm or other work site, an assessment of the terrain should be made. Particular
 care is required to avoid contact with overhead powerlines and when travelling on sloping
 or uneven ground. Travel at reduced speed.

7.8 INSPECTION, MAINTENANCE AND REPAIR

The post driver must be inspected regularly in accordance with manufacturer's instructions to ensure it is functioning correctly. All problems identified must be rectified prior to its use. All safety features must be maintained to ensure they are functioning as intended. Where parts or components require replacing, replacements must be identical or equivalent to the original parts and components.

If the post driver needs repairing, repairs should be carried out according to the manufacturer's instructions. Where there are no instructions available for the particular repair required, the owner must seek advice from the manufacturer or their agent, or have the necessary work specified by a competent person.

7.9 POWER TAKE OFF (PTO) SHAFTS

All PTO shafts should be guarded in accordance with the Australian Standard AS 1121 *Agricultural tractor power take-offs* or the appropriate International Standard(s) ISO 500-1, ISO 500-3, ISO 5673-1 and ISO 5674.

7.10 MODIFICATIONS

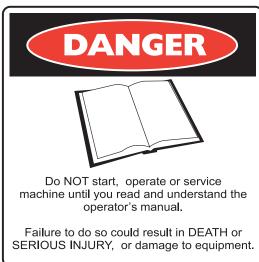
A post driver should not be modified or altered. However, if it is necessary to modify one, all modifications must be done by a competent person, based on a risk assessment. It is important to emphasise that the competent person who undertakes the modification assumes the role of the designer and manufacturer. All safety features must be retained in the modified machine.

Safety instructions must be reviewed after all modifications are carried out, and revised where necessary.

APPENDIX A - SAFETY SIGNS

Every post driver must clearly display, on the operator's side and the opposite side of the machine, pictorial and written signs warning against the serious safety risks outlined in this industry safety standard. The following are examples of safety signs that may be used:







DANGER

BEWARE OF OVERHEAD ELECTRICAL HAZARDS

WORK IN THE VICINITY OF OVERHEAD ELECTRICAL APPARATUS REQUIRES

- completion of a written risk assessment and use of a safe system of work
- b. approach distances for work near live overhead powerlines of
- c. use of a safety observer for work within the approach distances listed
- d. compliance with the requirements of the Network Operator
- 3 m for voltages up to 132,000V
- 6 m for voltages above 132,000V and up to 330,000V
- 8 m for voltages above 330,000V

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DON'T RISK IT



- Dial Before You Dig is a free referral service for receiving information on underground pipes and cables before you start work.
- All major utilities are members including Energy Australia, Integral Energy, Telstra, Optus, Agility and Sydney Water.
- Digging without maps means exposing yourself and your contractors to danger.
- · Unexpected cable strikes can slow your job down.
- Damage to underground utilities can affect your insurance.

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APPENDIX B - PRE-PURCHASE CHECKLIST

The following checklist can be used by a person wishing to purchase a post driver, to ensure it complies with the important safety features specified in this industry safety standard. It should be used prior to purchasing the post driver. Some items need to be addressed prior to purchasing – eg checking the tractor's characteristics and ensuring that there is a safe storage area.

Tick **YES** or **NO** as appropriate against each item. If you review and complete this checklist with all 'yes' answers, your post driver should enable you to meet your legal safety obligations. Where you answer 'no' to any question, you will need to address the issue to ensure that you comply with those obligations.

ITEM	YES	NO	COMMENT
Is the post driver appropriate for your needs?			
Is the post driver suitable for use with your tractor? (See section 4.4)			
Enclosed guard – Is the hammer guarded to a height of 2.4 m and a minimum of 300 mm below the bottom of the drop height? (See section 4.1.1)			
Enclosed guard – If posts can be driven to ground level is the hammer guarded to 300 mm above ground level? (See section 4.1.1)			
Enclosed guard – When the guard is opened is the drop speed restricted to 100 mm/second or less when open? (See section 4.1.1)			
Horizontal bar guard – Are bars at least 300 mm from the hammer, at least 25 mm in diameter and at vertical spacings of 150 mm or less? (See section 4.1.2)			
Horizontal bar guard – Is the opening at the front of the guard 250 mm or less in width? (See section 4.1.2)			
Horizontal bar guard – Is there an auxiliary guard at the operating position to protect the operator? (See section 4.1.2)			
Are drive belts, pulleys, chains and sprockets fully guarded, including back guarded? (See section 4.1.3)			
Are chains and sprockets fully enclosed along their length? (See section 4.1.3)			
Are winch ropes guarded to prevent contact with 'nip points' between ropes and sheaves? (See section 4.1.4)			
Are all controls clearly and permanently identified? (See section 4.2)			
Do all control levers return to neutral when released? (See section 4.2)			
Is the up/down lever orientated differently from other levers? (See section 4.2)			
For post drivers with an automatic hammer cycling operation – Is there an emergency stop fitted? (See section 4.2)			
Self-powered post drivers – Is there a master switch fitted? (See section 4.2)			
Are wire ropes swaged if used for lifting the hammer? (See section 4.3)			

ITEM	YES	NO	COMMENT
Is there information supplied stating the weight of the post driver? (See section 4.4)			
Is there a guide for holding the post when being driven so that there is no need for someone to hold the post (except where the speed of the hammer is restricted to 100 mm/second or less)? (See section 4.5)			
Do hydraulic hoses have a safety factor of 4:1? (See section 4.6)			
Electrically-powered or controlled post drivers – Is the wiring in accordance with AS/NZS 3000 and AS/NZS 3100? (See section 4.7)			
Are safety signs positioned on both sides of the post driver, warning of the serious safety risks? (See section 4.8 and appendix A)			
Are manufacturer's safe operating instructions provided with the post driver? (See section 5.2)			
Is there practical safety information provided by the supplier? (See section 6.2)			
Is a weatherproof receptacle provided on the post driver to hold the safe operating instructions and labelled accordingly? (See section 4.9 and 7.2)			
Is information provided on safe storage and transport of the post driver? (See section 7.7)			
Do you have a storage area where the post driver can be stored safely? (See section 7.7)			
Is maintenance information provided with the post driver? (See section 7.8)			

APPENDIX C – FOR FURTHER INFORMATION

WorkCover NSW

- Go to WorkCover's website at www.workcover.nsw.gov.au
- Call the WorkCover Assistance Service on 13 10 50
- Call the WorkCover Publications Hotline on 1300 799 003
- Visit your nearest WorkCover office
- For technical specifications for post drivers, contact your local manufacturer

Workplace Health and Safety Queensland

GPO Box 69

Brisbane 4001

Workplace health and safety infoline: 1300 367 915

Electrical safety infoline: 1300 650 622

Website: www.worksafe.qld.gov.au

WorkSafe Victoria

Advisory Service 222 Exhibition Street Melbourne VIC 3000

Telephone: 03 9641 1444 Toll free: 1800 136 089

Email: info@worksafe.vic.gov.au Website: www.worksafe.vic.gov.au

WorkSafe Western Australia

1260 Hay Street

West Perth WA 6005 Telephone: 08 9327 8777

Toll Free: 1300 307 877

Email: safety@commerce.wa.gov.au Website: www.worksafe.wa.gov.au

AUSTRALIAN STANDARDS

Australian Standards can be purchased from SAI Global by contacting the Customer Service Centre on 13 12 42 or over the net at www.saiglobal.com/shop

AS 1121	Agricultural tractor power take-offs
AS 1318	Use of colour for the marking of physical hazards and the identification of certain equipment in industry (known as the SAA Industrial Safety Colours Code)
AS 1319	Safety signs for the occupational environment
AS 1418.1	Cranes, hoists and winches – Part 1 – General requirements
AS 1418.2	Cranes, hoists and winches – Part 2 – Serial hoists and winches
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3760	In-service safety inspection and testing of electrical equipment
AS/NZS 3190	Approval and test specification – Residual current devices (current operated earth leakage devices)
AS/NZS 3100	Approval and test specification – General requirements for electrical equipment
ISO 500-1	Agricultural tractors – Rear-mounted power take-off types 1, 2 and 3 – Part 1: General specifications, safety requirements, dimensions for master shield and clearance zone
ISO 500-3	Agricultural tractors – Rear-mounted power take-off types 1, 2 and 3 – Part 3: Main PTO dimensions and spline dimensions, location of PTO
ISO 5673-1	Agricultural tractors and machinery – Power take-off drive shafts and power-input connection – Part 1: General manufacturing and safety requirements
ISO 5674	Tractors and machinery for agriculture and forestry - Guards for power take- off (PTO) drive-shafts – Strength and wear tests and acceptance criteria

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