



Guarding of Farm Field Equipment, Farmstead Equipment, and Cotton Gins — OSHA Standard 1928.57 ¹

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The Impact of Safety on Florida Agriculture

Florida agriculture, including forestry and fishing, made an annual economic impact of \$98 billion in 2004. More than 390,000 workers are directly employed in these industries in Florida, and another 380,000 people are employed in activities related to agriculture (Hodges 2006). The state's agricultural enterprises range from large citrus, vegetable and cattle operations to small family-operated farms.

In spite of the popular images of agriculture, it is a highly mechanized, industrial profession with one of the highest injury and death rates among U.S. industries. The last study of death rates in Florida agriculture (Liller 2000) found 240 deaths from 1989 to 1998. In 2005, the Bureau of Labor Statistics (BLS 2005a) reported that death due to injury in agriculture was 31.4 deaths per 100,000 full-time workers, which was the highest rate among all major occupational groups and an increase of 14% over 2004. Also in 2005, the Bureau of Labor Statistics reported 6,100 injuries per 100,000 full-time workers (BLS 2005b).

Safety in Florida agriculture is challenging because:

- the state's agricultural enterprises are diverse,
- safety knowledge among workers varies,
- manual labor is used extensively,
- the climate creates year-round heat stress.

Therefore, it is vital to assist the public in learning about OSHA documents related to agriculture. More information about the OSHA Standards and agricultural safety is available at the following Web sites:

- Florida AgSafe: <http://www.flagsafe.ufl.edu>
- OSHA Regulations: <http://www.osha.gov/comp-links.html>
- National Agricultural Safety Database: <http://www.cdc.gov/nasd>

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Overview

This document, a condensation of Section 1928.57 of the Occupational Safety and Health Act (29 CFR), is not intended to be totally inclusive but rather to highlight the information and requirements in the complete OSHA standard that owners and managers of agricultural businesses should understand. Refer to the OSHA Web site given above for the complete standard and for court interpretations of the standard.

Contents of OSHA Standard 1928.57

- Section 1928.57(a) — General
- Section 1928.57(b) — Farm Field Equipment
- Section 1928.57(c) — Farmstead Equipment
- Section 1928.57(d) — Cotton Ginning Equipment

NOTE: Some sections of OSHA standards are labeled "Reserved." This label implies either that information has been deleted from the previous version of the standard or that additions to the standard are anticipated. Because standards often reference other standards, it is important that paragraph numbers remain consistent.

Section 1928.57(a) — General

1928.57(a)(1) — Purpose. The purpose of this section is to provide for the protection of employees from the hazards associated with moving machinery parts of farm field equipment, farmstead equipment, and cotton gins used in any agricultural operation.

1928.57(a)(2) — Scope. Paragraph (a) of this section contains general requirements which apply to all covered equipment. In addition, paragraph (b) of this section applies to farm field equipment, paragraph (c) of this section applies to farmstead equipment, and paragraph (d) of this section applies to cotton gins.

1928.57(a)(3) — Application. This section applies to all farm field equipment, farmstead equipment, and cotton gins, except that paragraphs (b)(2), (b)(3), and (b)(4) (ii)(A), and (c)(2), (c)(3), and (c)(4) (ii)(A) do not apply to equipment manufactured before October 25, 1976.

1928.57(a)(4) — Effective Date. This section takes effect on October 25, 1976, except that paragraph (d) of this section is effective on June 30, 1977.

1928.57(a)(5) — Definitions

- **Cotton gin** — A system of machines which condition seed cotton, separate lint from seed, convey materials, and package lint cotton.
- **Farm field equipment** — Tractors or implements, including self-propelled implements, or any combination thereof used in agricultural operations.
- **Farmstead equipment** — Agricultural equipment normally used in a stationary manner. This includes, but is not limited to, materials handling equipment and accessories for such equipment whether or not the equipment is an integral part of a building.
- **Ground-driven components** — Components which are powered by the turning motion of a wheel as the equipment travels over the ground.
- **Guard or Shield** — A barrier designed to protect against employee contact with a hazard created by a moving machinery part.
- **Power Take-off Shaft** — The shafts and knuckles between the tractor, or other power source, and the first gear set, pulley, sprocket, or other components on power take-off shaft-driven equipment.

1928.57(a)(6) — Operating Instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all covered equipment with which he is or will be involved, including at least the following safe operating practices:

- (i) — keep all guards in place when the machine is in operation;
- (ii) — permit no riders on farm field equipment other than persons required for instruction or assistance in machine operation;

(iii) — stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning, or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment;

(iv) — make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine, and,

(v) — lock out electrical power before performing maintenance or service on farmstead equipment.

1928.57(a)(7) — Methods of Guarding. Except as otherwise provided in this subpart, each employer shall protect employees from coming into contact with hazards created by moving machinery parts as follows:

(i) — through the installation and use of a guard or shield or guarding by location, and,

(ii) — whenever a guard or shield or guarding by location is infeasible, by using a guardrail or fence.

1928.57(a)(8) — Strength and Design of Guards

(i) — where guards are used to provide the protection required by this section, they shall be designed and located to protect against inadvertent contact with the hazard being guarded.

(ii) — unless otherwise specified, each guard and its supports shall be capable of withstanding the force that a 250 pound individual, leaning on or falling against the guard, would exert upon that guard.

(iii) — guards shall be free from burrs, sharp edges, and sharp corners, and shall be securely fastened to the equipment or building.

1928.57(a)(9) — Guarding by Location. A component is guarded by location during operation, maintenance, or servicing when, because of its location, no employee can inadvertently come in contact with the hazard during such operation, maintenance, or servicing. Where the employer can show that any exposure to hazards results from

employee conduct which constitutes an isolated and unforeseeable event, the component shall also be considered guarded by location.

1928.57(a)(10) — Guarding by Railings. Guardrails or fences shall be capable of protecting against employees inadvertently entering the hazardous area.

1928.57(a)(11) — Servicing and Maintenance. Whenever a moving machinery part presents a hazard during servicing or maintenance, the engine shall be stopped, the power source disconnected, and all machine movement stopped before servicing or maintenance is performed, except where the employer can establish that:

(i) — the equipment must be running to be properly serviced or maintained;

(ii) — the equipment cannot be serviced or maintained while a guard or guards otherwise required by this standard are in place; and,

(iii) — the servicing or maintenance can be safely performed.

Section 1928.57(b) — Farm field Equipment

1928.57(b)(1) — Power Take-off Guarding

(i) — All power take-off shafts, including rear, mid- or side-mounted shafts, shall be guarded either by a master shield, as provided in paragraph (b)(1)(ii) of this section, or by other protective guarding.

(ii) — All tractors shall be equipped with an agricultural tractor master shield on the rear power take-off except where removal of the tractor master shield is permitted by paragraph (b)(1)(iii) of this section. The master shield shall have sufficient strength to prevent permanent deformation of the shield when a 250 pound operator mounts or dismounts the tractor using the shield as a step.

(iii) — Power take-off driven equipment shall be guarded to protect against employee contact with positively driven rotating members of the power drive system. Where power take-off driven equipment is of

a design requiring removal of the tractor master shield, the equipment shall also include protection from that portion of the tractor power take-off shaft which protrudes from the tractor.

(iv) — Signs shall be placed at prominent locations on tractors and power take-off driven equipment specifying that power drive system safety shields must be kept in place.

1928.57(b)(2) — Other Power Transmission Components

(i) — The mesh or nip-points of all power-driven gears, belts, chains, sheaves, pulleys, sprockets, and idlers shall be guarded.

(ii) — All revolving shafts, including projections such as bolts, keys, or set screws, shall be guarded, except smooth shaft ends protruding less than one-half the outside diameter of the shaft and its locking means.

(iii) — Ground-driven components shall be guarded in accordance with paragraphs (b)(2)(i) and (b)(2)(ii) of this section if any employee may be exposed to them while the drives are in motion.

1928.57(b)(3) — Functional Components.

Functional components, such as snapping or husking rolls, straw spreaders and choppers, cutterbars, flail rotors, rotary beaters, mixing augers, feed rolls, conveying augers, rotary tillers, and similar units, which must be exposed for proper function, shall be guarded to the fullest extent which will not substantially interfere with normal functioning of the component.

1928.57(b)(4) — Access to Moving Parts

(i) — Guards, shields, and access doors shall be in place when the equipment is in operation.

(ii) — Where removal of a guard or access door will expose an employee to any component which continues to rotate after the power is disengaged, the employer shall provide, in the immediate area, the following:

(A) a readily visible or audible warning of rotation; and,

(B) a safety sign warning the employee to

(1) look and listen for evidence of rotation and

(2) not remove the guard or access door until all components have stopped.

Section 1928.57(c) — Farmstead Equipment

1928.57(c)(1) — Power Take-off Guarding

(i) — All power take-off shafts, including rear, mid-, or side-mounted shafts, shall be guarded either by a master shield as provided in paragraph (b)(1)(ii) of this section or other protective guarding.

(ii) — Power take-off driven equipment shall be guarded to protect against employee contact with positively driven rotating members of the power drive system. Where power take-off driven equipment is of a design requiring removal of the tractor master shield, the equipment shall also include protection from that portion of the tractor power take-off shaft which protrudes from the tractor.

(iii) — Signs shall be placed at prominent locations on power take-off driven equipment specifying that power drive system safety shields must be kept in place.

1928.57(c)(2) — Other Power Transmission Components

(i) — The mesh or nip-points of all power-driven gears, belts, chains, sheaves, pulleys, sprockets, and idlers shall be guarded.

(ii) — All revolving shafts, including projections such as bolts, keys, or set screws, shall be guarded, with the exception of:

(A) smooth shafts and shaft ends (without any projecting bolts, keys or set screws), revolving at less than 10 rpm, on feed handling equipment used on the top surface of materials in bulk storage facilities; and

(B) smooth shaft ends protruding less than one-half the outside diameter of the shaft and its locking means.

1928.57(c)(3) — Functional Components

(i) — Functional components, such as choppers, rotary beaters, mixing augers, feed rolls, conveying augers, grain spreaders, stirring augers, sweep augers, and feed augers, which must be exposed for proper function, shall be guarded to the fullest extent which will not substantially interfere with the normal functioning of the component.

(ii) — Sweep arm material gathering mechanisms used on the top surface of materials within silo structures shall be guarded. The lower or leading edge of the guard shall be located no more than 12 inches above the material surface and no less than 6 inches in front of the leading edge of the rotating member of the gathering mechanism. The guard shall be parallel to, and extend the fullest practical length of, the material-gathering mechanism.

(iii) — Exposed auger flighting on portable grain augers shall be guarded with either grating type guards or solid baffle style covers as follows:

(A) the largest dimensions or openings in grating type guards through which materials are required to flow shall be 4 3/4 inches. The area of each opening shall be no larger than 10 square inches. The opening shall be located no closer to the rotating flighting than 2 1/2 inches.

(B) slotted openings in solid baffle style covers shall be no wider than 1 1/2 inches, or closer than 3 1/2 inches to the exposed flighting.

1928.57(c)(4) — Access to Moving Parts

(i) — Guards, shields, and access doors shall be in place when the equipment is in operation.

(ii) — Where removal of a guard or access door will expose an employee to any component which continues to rotate after the power is disengaged, the employer shall provide, in the immediate area, the following:

(A) A readily visible or audible warning of rotation; and,

(B) A safety sign warning the employee to:
(1) Look and listen for evidence of rotation; and

(2) Not remove the guard or access door until all components have stopped.

1928.57(c)(5) — Electrical Disconnect Means

(i) — Application of electrical power from a location not under the immediate and exclusive control of the employee or employees maintaining or servicing equipment shall be prevented by:

(A) providing an exclusive, positive locking means on the main switch which can be operated only by the employee or employees performing the maintenance or servicing; or

(B) in the case of material handling equipment located in a bulk storage structure, by physically locating on the equipment an electrical or mechanical means to disconnect the power.

(ii) — All circuit protection devices, including those which are an integral part of a motor, shall be of the manual reset type, except where:

(A) — the employer can establish that because of the nature of the operation, distances involved, and the count of time normally spent by employees in the area of the affected equipment, use of the manual reset device would be infeasible;

(B) — there is an electrical disconnect switch available to the employee within 15 feet of the equipment upon which maintenance or service is being performed; and

(C) — a sign is prominently posted near each hazardous component which warns the employee that, unless the electrical disconnect switch is utilized, the motor could automatically reset while the employee is working on the hazardous component.

Section 1928.57(d) — Cotton Ginning Equipment**1928.57(d)(1) — Power Transmission Components**

(i) — The main drive and miscellaneous drives of gin stands shall be completely enclosed, guarded by location, or guarded by railings [consistent with the requirements of paragraph (a)(7) of this section]. Drives between gin stands shall be guarded so as to prevent access to the area between machines.

(ii) — When guarded by railings, any hazardous component within 15 horizontal inches of the rail shall be completely enclosed. Railing height shall be approximately 42 inches off the floor, platform, or other working surface, with a midrail between the top-rail and the working surface. Panels made of materials conforming to the requirements in Table D-1, or equivalent, may be substituted for midrails. Guardrails shall be strong enough to withstand at least 200 pounds force on the top rail.

(iii) — Belts guarded by railings shall be inspected for defects at least daily. The machinery shall not be operated until all defective belts are replaced.

(iv) — Pulleys of V-belt drives shall be completely enclosed or guarded by location whether or not railings are present. The open end of the pulley guard shall be not less than 4 inches from the periphery of the pulleys.

(v) — Chains and sprockets shall be completely enclosed, except that they may be guarded by location if the bearings are packed or if accessible extension lubrication fittings are used.

(vi) — Where complete enclosure of a component is likely to cause a fire hazard due to excessive deposits of lint, only the face section of nip-point and pulley guards is required. The guard shall extend at least 6 inches beyond the rim of the pulley on the in-running and off-running sides of the belt, and at least 2 inches from the rim and face of the pulley in all other directions.

(vii) — Projecting shaft ends not guarded by location shall present a smooth edge and end, shall be guarded by non-rotating caps or safety sleeves, and may not protrude more than one-half the outside diameter of the shaft.

(viii) — In power plants and power development rooms where access is limited to authorized personnel, guard railings may be used in place of guards or guarding by location. Authorized employees having access to power plants and power development rooms shall be instructed in the safe operation and maintenance of the equipment in accordance with paragraph (a)(6) of this section.

1928.57(d)(2) — Functional Components

(i) — Gin stands shall be provided with a permanently installed guard designed to preclude contact with the gin saws while in motion. The saw blades in the roll box shall be considered guarded by location if they do not extend through the ginning ribs into the roll box when the breast is in the out position.

(ii) — Moving saws on lint cleaners which have doors giving access to the saws shall be guarded by fixed barrier guards or their equivalent which prevent direct finger or hand contact with the saws while the saws are in motion.

(iii) — An interlock shall be installed on all balers so that the upper gates cannot be opened while the tramper is operating.

(iv) — Top panels of burr extractors shall be hinged and equipped with a sturdy positive latch.

(v) — All accessible screw conveyors shall be guarded by substantial covers or gratings, or with an inverted horizontally slotted guard of the trough type, which will prevent employees from coming into contact with the screw conveyor. Such guards may consist of horizontal bars spaced so as to allow material to be fed into the conveyor, and supported by arches which are not more than 8 feet apart. Screw conveyors under gin stands shall be considered guarded by location.

1928.57(d)(3) — Warning Device. A warning device shall be installed in all gins to provide an audible signal which will indicate to employees that any or all of the machines comprising the gin are about to be started. The signal shall be of sufficient volume to be heard by employees, and shall be sounded each time before starting the gin.

References

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Table 1. Table D-1. Examples of Minimum Requirements For Guard Panel Materials

Material	Clearance from moving part at all points (in inches)	Largest mesh or opening allowable (in inches)	Minimum gage (U.S. standard) or thickness
Woven wire	Under 2	3/8	16
	2 to 4	1/2	16
	4 to 15	2	12
Expanded Metal	Under 4	1/2	18
	4 to 15	2	13
Perforated Metal	Under 4	1/2	20
	4 to 15	2	14
Sheet Metal	Under 4	---	22
	4 to 15	---	22
Plastic	Under 4	---	†
	4 to 15	---	†

† Tensile strength of 10,000 lb./in²