

**SOUTH DAKOTA**  
**DEPARTMENT OF PUBLIC SAFETY**  
**DIVISION OF COMMERCIAL INSPECTION AND REGULATION**

**Regulations and Recommendations**  
**for**  
**Selection, Installation and Maintenance of**  
**Vehicle and Livestock Scales**



**SOUTH DAKOTA**  
**OFFICE OF WEIGHTS AND MEASURES**

## IMPORTANT NOTICE

Scales in commercial service are required by law to meet all applicable requirements of the National Institute of Standards and Technology (NIST) Handbook 44, as well as all applicable South Dakota Codified Laws.

The following information serves only as a guide for the prospective scale owner and is not all-inclusive. Questions regarding these rules and regulations should be addressed to the SOUTH DAKOTA OFFICE OF WEIGHTS AND MEASURES, 118 W. CAPITOL, PIERRE, SD 57501-2017. PHONE (605) 773-3697.

Selection of Scales. The following statements are the policies of the South Dakota Weights and Measures program per South Dakota Codified Law Chapter 37-21.

1. Since 1969 all weighing and measuring devices have been required to meet NIST Handbook 44 for commercial use per SDCL 37-21-5 and 37-21-6.
2. Since October 14, 1984 all weights, measures and weighing and measuring devices for commercial use are required to have been issued a NIST Certificate of Conformance PER SDCL 37-21-5 and 37-21-6; Rule number 20:01:02:03.
3. Since October 14, 1984 the National Type Evaluation Program has been adopted per NIST Handbook 130, IV-81, 1984 edition, under the authority of SDCL 37-21-5 and 37-21-6; Rule number 20:01:02:03.

Consequently, any weighing and measuring devices, where testing criteria exists, or individual component, such as indication, weighing elements, load cells, computing devices, liquid measuring devices or associated and non-associated equipment represented as suitable for commercial use, must comply with all requirements of Handbook 44 and must have been issued a Certificate of Conformance by the National Institute of Standards and Technology (NIST) before any sale or installation will be allowed for commercial use in South Dakota.

(Revised 9/1/00)

## VEHICLE SCALES

When selecting a scale, consideration must be given as to its suitability regarding weighing capacity, dimensions, location (environment), number and size of scale divisions, and needs that may arise in future weighing. One should not sacrifice quality for a low cost item.

**Location.** Vehicle scales must be located in convenient places so vehicles will have easy and safe access to them. **Per Rule 20:01:03:04. Concrete approach required:** A vehicle scale must have a 15-foot-long reinforced concrete approach at each end in the same plane as the platform. Approaches may be sloped 1/4 inch per foot so that water will drain away from the scale.

A straight approach to the scale is required. The approach length must be at least one-half the length of the scale platform, but the approach is not required to be more than 40 feet in length.

**Capacity.** It is recommended that the weighing capacity of a vehicle scale be at least 20% over the anticipated weighing requirements. This will result in longer scale life. Split-weighing, that is, weighing an axle at a time and adding the totals to determine gross weight is not legal for commercial trade. Therefore, a platform size that will accommodate the entire vehicle must be installed. The additional cost of the longer scale at time of installation is considerably less than to add to the length later.

Vehicle scales manufactured after January 1, 1986 must meet minimum and maximum number of division requirements. A minimum of 2000 divisions and a maximum of 10,000 divisions are required. The number of scale divisions can be determined by dividing the scale capacity by the division size.

**Example:**       $\frac{100,000 \text{ lb. capacity}}{10 \text{ lb. div.}} = 10,000 \text{ div.}$

Weighing Livestock on a Vehicle Scale. Regulation UR.3.8. Of the Scale Code of NIST Handbook 44 states:

**Minimum Load for Weighing Livestock**-A scale with scale divisions greater than 5 lbs. shall not be used for weighing net loads smaller than 500 divisions. (Amended 1989)

Installation. All vehicle scales installed in a fixed position, except those designed as pitless, must be installed in a scale pit. Scale pits are to be of reinforced concrete with steel angle iron copings around the inside top edge of pit walls.

In order to get the footing below frost line the pit depth **must** be at least 4 feet, measured from the bottom of the weighbridge I-Beams to the pit floor. This means that in most cases the total pit depth will be 6 feet or better. This is a very important point to understand. Failing to do so will result in a very costly mistake, and a totally uncertifiable scale.

A slab floor must be installed in the pit. The floor must be at least 12 inches thick with a minimum of grade 40 reinforcing rods running into all piers and sidewalls, installed according to the manufacturer's specifications.

Sidewalls must be 12 inches thick and end walls must be 16 inches thick except livestock scale end walls may be 12 inches thick, and must be mounted on the slab floor. A minimum of grade 40 reinforcing rods must be installed according to the manufacturer's specifications. Piers must be level and to the correct elevation.

Weight indicating elements, such as weighbeams and dials, must be mounted on concrete.

Adequate drainage must be provided by installing a drain or sump in the pit floor near the scale pit entrance to keep water out of the pit.

A vehicle scale is required to have a 15-foot long reinforced concrete approach at each end in the same plane (level with) as the platform. The approach **may** be sloped a maximum of 1/4 inch per foot so that water will drain away from the scale.

Ticket Printer. All vehicle scales must have a ticket printer. Some older model scales now in use do not meet this requirement, as they were installed before this law went into effect. Should you purchase a used scale and move it to a new location, the ticket printer requirement **MUST BE MET**. The additional cost should be considered.

**Lever System.** The lever system should be installed under the supervision of a competent scale service agency. It is absolutely essential that all levers be installed level and in proper alignment. All connections must be plumb and in proper vertical alignment. Careful and proper initial installation can add many years to the service life of your scale.

**Maintenance.** The scale pit must be kept reasonably clean and dry to provide for proper movement of the lever system and scale deck. Adequate clearance (1/2 inch to 3/4 inch) must be maintained around the outer edges of the scale platform and pit walls, again to ensure proper movement of the scale mechanisms.

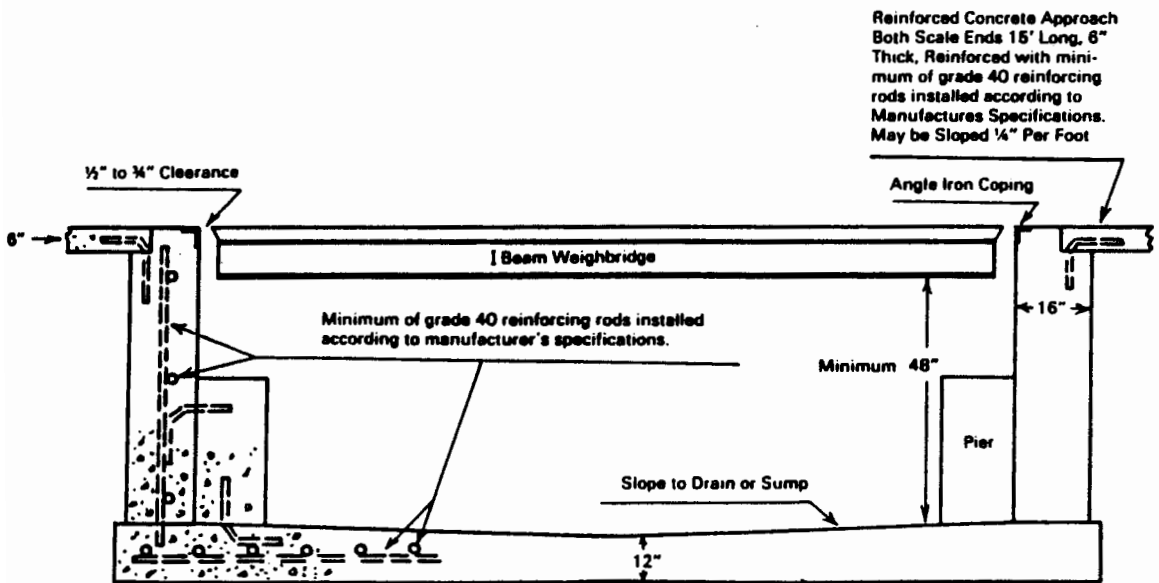
**Weighbeams.** The weighbeam notches, if so equipped, should be cleaned regularly (a wire brush works best) to provide for proper seating of the sliding poise. Substantial errors in weighments can result if this is not done.

**Balance.** All scales must, by law, be maintained in a zero balance condition with no load on the platform. It takes only seconds to properly balance a scale and results in more accurate weighments. **Failure to maintain a zero load balance is a Class 2 misdemeanor.**

**Scale Modification.** The length or the width of the scale platform must not be increased beyond the manufacturer's design dimensions, nor shall the capacity of a scale be increased beyond its design capacity by replacing or modifying the original indicator with one of a higher capacity, except when the modifications have been approved by competent engineering authority, and by the SD Office of Weights and Measures.

**Certification.** All scales used commercially must be inspected/tested annually by the Office of Weights and Measures. Accurate and correct devices will be certified for use in commercial transactions. An inspection fee, based on scale capacity, is assessed for each inspection. Special requests for inspections outside of the annual routine testing can be conducted, where feasible, with an additional assessment of mileage and hourly charges.

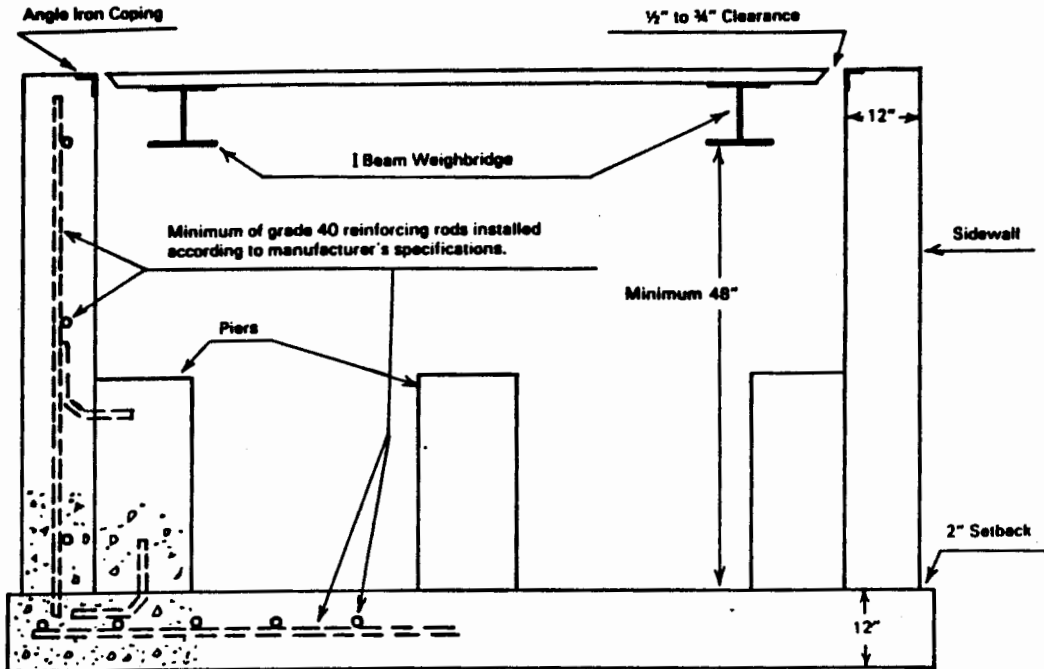
# PIT TYPE VEHICLE SCALE



**SIDE VIEW — VEHICLE SCALE**

Lever System Not Shown - Not Drawn to Scale

# PIT TYPE VEHICLE SCALE



**END VIEW - VEHICLE SCALE**  
Lever System Not Shown - Not Drawn to Scale

## ELECTRONIC AND MECHANICAL PITLESS VEHICLE SCALES

With the exception of the pit requirements, all electronic and mechanical pitless scales must meet the same requirements as the previously mentioned mechanical and lever-tronic pit-type scales.

**Foundation and Support.** The area of the foundation and support-bearing piers shall be matched to existing soil-bearing capabilities. Soil stabilized at the desired grade shall support at least 3000 pounds per square foot at pier location.

**Piers.** Piers must be of reinforced concrete poured to the depth of the frost line, but not less than four feet. The location and size of the piers must meet the manufacturer's design. All piers must be connected by a reinforced solid concrete slab at least four inches thick. Piers must support the combined loads of the weight of the scale, the weighbridge, and the maximum anticipated load of the scale. They must distribute these loads evenly over the underlying ground so there is minimum settlement of the structure throughout. Anchor bolts must be embedded in piers according to the manufacturer's design.

**Floating Slab.** In lieu of the pier structure required by 20:01:08:02, a floating slab of concrete, a minimum of 12 inches thick and reinforced with two rows of five-eighths inch rebar on one-foot centers, may be installed. The owner is responsible for design modification to suite existing soil conditions.

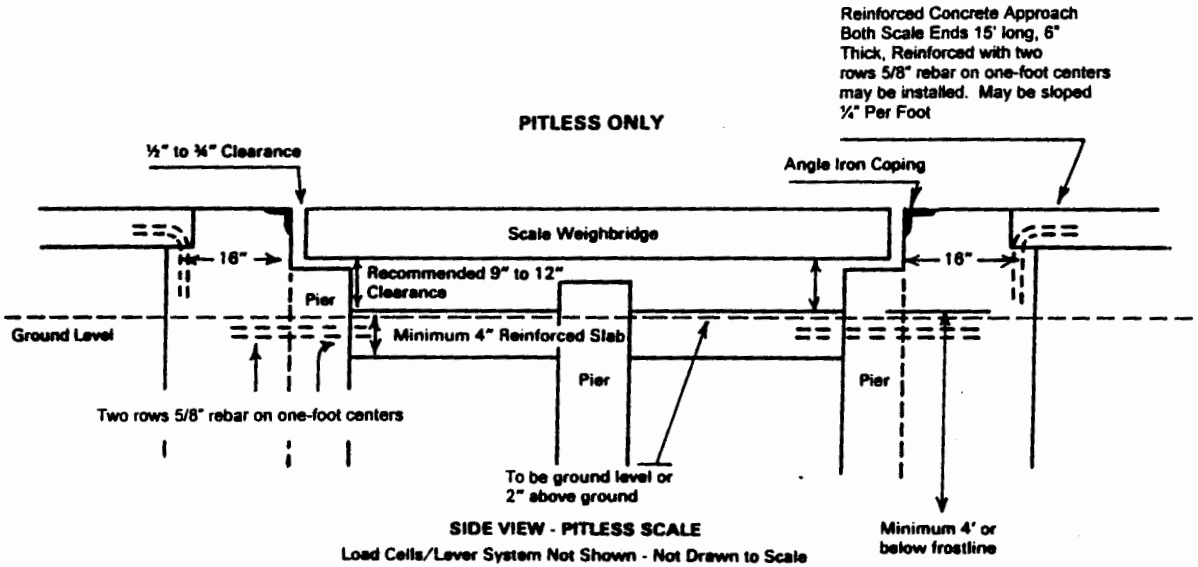
**Drainage.** Grading around the perimeter of the scale shall divert surface water away from the scale.

**Clearance.** Recommended clearance between the bottom of the deck and the slab is 9 to 12 inches.

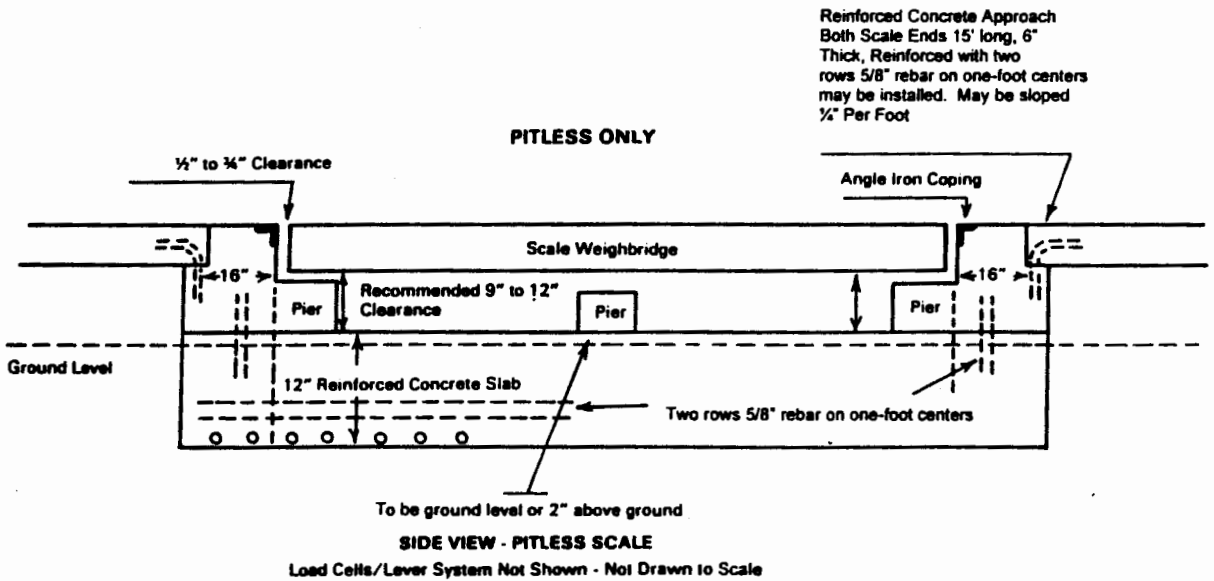
**Access.** The scale mechanisms must be readily accessible for inspection and servicing.



# PITLESS VEHICLE SCALE (Pier Structure)



# PITLESS VEHICLE SCALE (Floating Slab)



## LIVESTOCK SCALES, PIT-TYPE MECHANICAL

Livestock scales in commercial service must meet all applicable requirements of the National Institute of Standards and Technology Handbook 44, as well as all applicable South Dakota Codified Laws. Additionally, regulations of the Federal Packers and Stockyards Administration may apply to some livestock scale installations. Questions regarding these rules and regulations should be addressed to the **SD OFFICE OF WEIGHTS AND MEASURES, 118 W. CAPITOL, PIERRE, SD 57501-2017. Phone (605) 773-3697.**

When selecting a livestock scale, consideration must be given as to its suitability regarding weighing capacity, dimensions, location, number and size of scale divisions (no larger than 5 lb. divisions), and needs that may arise in future weighing. One should not sacrifice quality for a low cost item.

**Location.** Livestock scales should be located in convenient, accessible weighing locations in regard to pens, etc., as well as for testing purposes. Drainage and weather effects must be considered, particularly wind effects in our area. The scale should be **fully enclosed** in a building to avoid these problems. The added cost of the housing will be offset by the many additional years of service life of the scale.

To maintain your scales commercial certification, it will be required to undergo at least an annual inspection/testing. Easy and safe access to your scale must be provided for the Weights and Measures Official and all necessary equipment. State test trucks require a minimum of 12 feet of overhead clearance, and at least 10 feet in width of any alleys. These clearances should be considered in any construction plans.

**Capacity.** The weighing capacity and size of scale platform is directly related to the size of drafts being weighed. The recommended capacity **per square foot** of platform size is 110 pounds for cattle, 70 pounds for calves, and 50 pounds for sheep and hogs.

Livestock scales **manufactured after January 1, 1986** must meet minimum and maximum number of scale division requirements. A minimum of 2000 divisions and a maximum of 10,000 divisions are required. The number of scale divisions can be determined by dividing the scale capacity by the scale division size (5 lbs).

**Example:**     50,000 lb. Capacity     = 10,000 div.  
                  5 lb. div.

In this example we have the maximum allowed number of divisions. All livestock scales must have a 5-pound or less division size. Therefore, a 50,000 capacity scale is the largest **livestock** scale that is legal for commercial use. If you are at all confused by this requirement, please, do not hesitate to call our office.

Animal scales, that is, single animal scales fall under a different class code than livestock scales. The requirements for animal scales differ somewhat. Should you consider the installation of an animal scale, please, consult with our office.

**Installation.** All livestock scales, except those **designed** as pitless, must be installed in a scale pit. Scale pits are to be of reinforced concrete with steel angle iron copings around the inside top edge of pit walls.

In order to get the footing below frost line the pit depth **must** be at least 4 feet, measured from the bottom of the weighbridge I-beams to the top of the pit floor. This means that in most cases the total pit depth will be 6 feet or better. This is a very important point to understand. Failing to do so will result in a very costly mistake, and a totally uncertifiable scale.

A slab floor must be installed in the pit. The floor must be at least 12 inches thick with a minimum of grade 40 reinforcing rods running into all piers and sidewalls, and installed according to the manufacturer's specification.

Sidewalls must be 12 inches thick and end walls for livestock scales only may be 12 inches thick, and must be mounted on the slab floor. A minimum of grade 40 reinforcing rods must be installed according to the manufacturer's specifications. Piers must be level and to the correct elevation.

Weight indicating elements, such as weighbeams and dials, must be mounted on concrete.

**Drainage.** Adequate drainage must be provided by installing a drain or sump in the pit floor near the scale pit entrance to keep water out of the pit.

**Approach.** A 15-foot reinforced concrete approach, in the same plane (level with) as the scale platform is required on the most accessible end of the scale for testing purposes. The approach **may** be sloped a **maximum** of 1/4 inch per foot so that water will drain away from the scale. Again, bear in mind that adequate clearances must be provided so the scale test truck can be backed close to the scale.

**Ticket Printer.** The Packers and Stockyards Administration requires that livestock scales have a ticket printer. Should you purchase a used scale it must meet this requirement.

**Lever System.** The lever system should be installed under the supervision of a competent scale service agency. It is absolutely essential that all levers be installed **level** and in proper alignment. All connections must be **plumb** and in proper vertical alignment. Careful and proper initial installation can add many years to the service life of your scale.

**Maintenance.** The scale pit must be kept reasonably clean and dry to provide for proper movement of the lever system and scale deck. Adequate clearance (1/2 inch to 3/4 inch) must be maintained around the outer edges of the scale platform and pit walls, again to ensure proper movement of the scale mechanisms.

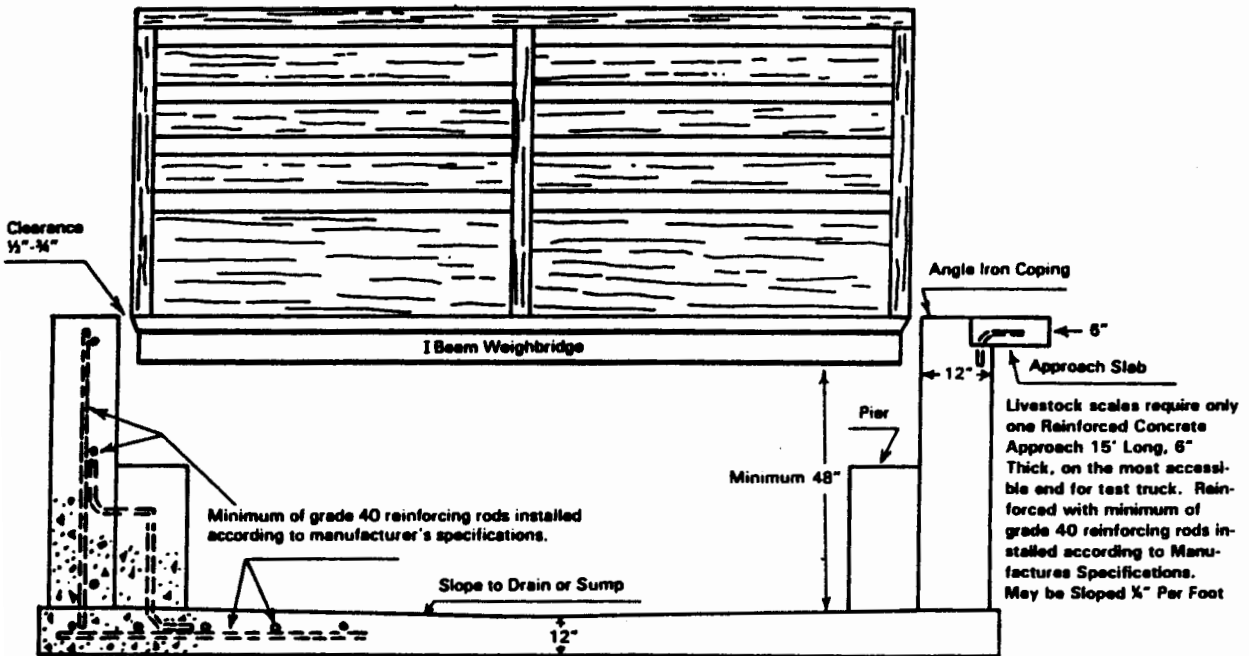
**Weighbeams.** The weighbeam notches, if so equipped, should be cleaned regularly (a wire brush works best) to provide for proper seating of the sliding poise. Substantial errors in weighments can result if this is not done.

**Balance.** All scales **must**, by law, be maintained in a zero balance condition with no load on the platform. It takes only seconds to properly balance a scale and results in more accurate weighments. Failure to maintain a zero load balance is a Class 2 misdemeanor.

**Scale Modification.** The length or the width of the scale platform must not be increased beyond the manufacturer's design dimensions, nor shall the capacity of a scale be increased beyond its design capacity by replacing or modifying the original indicator with one of a higher capacity, except when the modifications have been approved by competent engineering authority, and by the SD Office of Weights and Measures.

**Certification.** All scales used **commercially** must be inspected/tested annually by the Office of Weights and Measures. Accurate and correct devices will be certified for use in commercial transactions. An inspection fee, based on scale capacity, is assessed for each inspection. Special requests for inspections outside of the annual routine testing can be conducted, where feasible, with an additional assessment of mileage and hourly charges.

# PIT TYPE LIVESTOCK SCALE

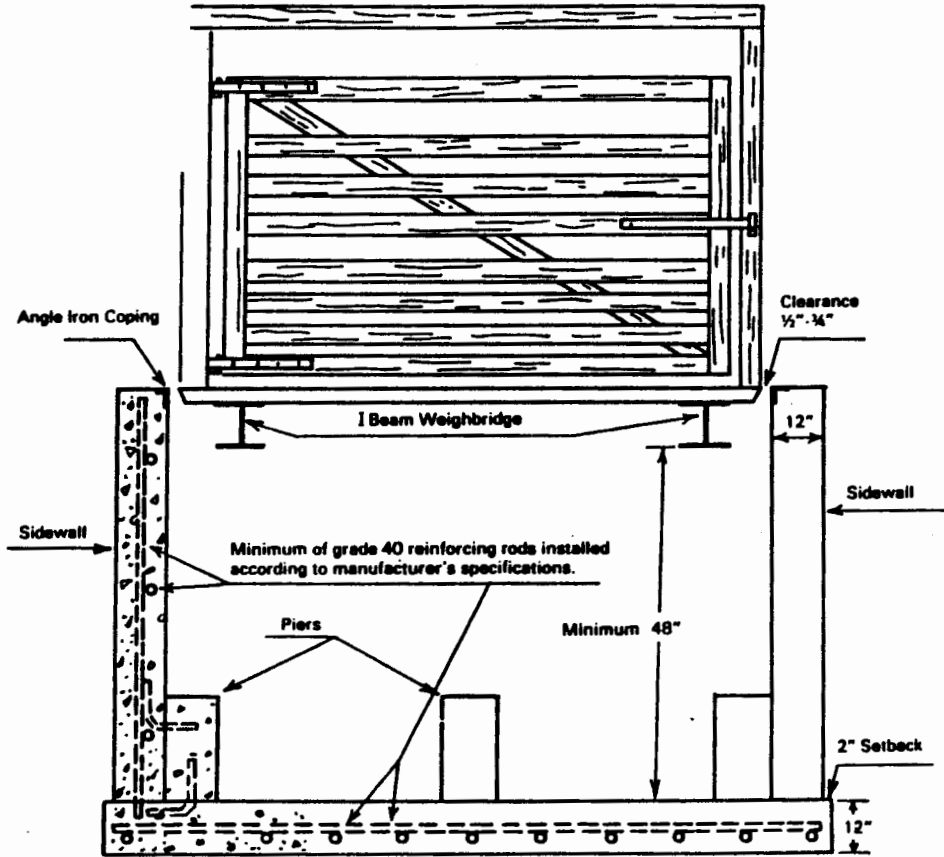


## SIDE VIEW — LIVESTOCK SCALE

Lever System Not Shown - Not Drawn to Scale

Note: Building Enclosure Not Shown

# PIT TYPE LIVESTOCK SCALE



**END VIEW - LIVESTOCK SCALE**

Lever System Not Shown-Not Drawn to Scale

Note: Building Enclosure Not Shown

## ELECTRONIC AND MECHANICAL PITLESS LIVESTOCK SCALES

With the exception of the pit requirements, all electronic and mechanical pitless scales must meet the same requirements as the previously mentioned mechanical and lever-tronic pit-type scales.

**Foundation and Support.** The area of the foundation and support-bearing piers shall be matched to existing soil-bearing capabilities. Soil stabilized at the desired grade shall support at least 3000 pounds per square foot at pier location.

**Piers.** Piers must be of reinforced concrete poured to the depth of the frost line, but not less than four feet. The locations and size of the piers must meet the manufacturer's design. All piers must be connected by a reinforced solid concrete slab at least four inches thick. Piers must support the combined loads of the weight of the scale, the weighbridge, and the maximum anticipated load of the scale. They must distribute these loads evenly over the underlying ground so there is minimum settlement of the structure throughout. Anchor bolts must be embedded in piers according to the manufacturer's design.

**Floating Slab.** In lieu of the pier structure required by 20:01:08:02, a floating slab of concrete, a minimum of 12 inches thick and reinforced with two rows of five-eighths inch rebar on one-foot centers, may be installed. The owner is responsible for design modification to suite existing soil conditions.

**Drainage.** Grading around the perimeter of the scale shall divert surface water away from the scale.

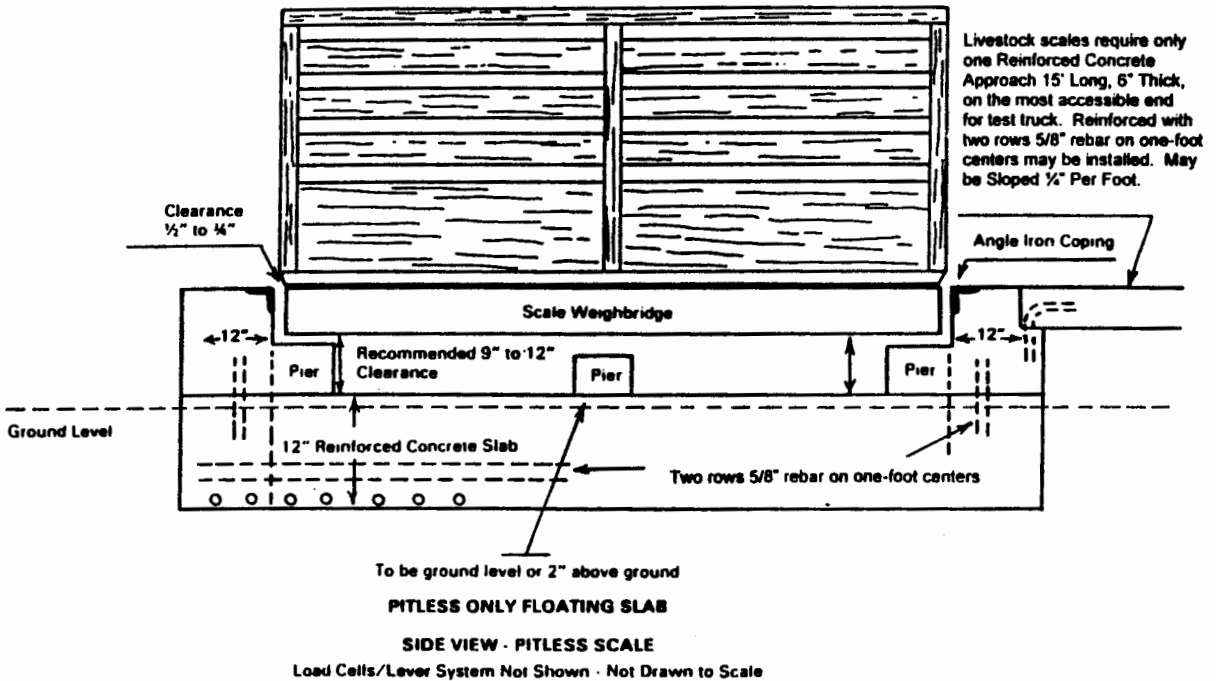
This type of scale should be fully housed, and designed and installed with a crawl space between the weighbridge steel and the concrete slab of sufficient size to allow for easy access for thorough cleaning and any necessary repairs, as well as for inspection/testing.

**Clearance.** Recommended clearance between bottom of deck and the slab is 9 to 12 inches.

**Access.** The scale mechanisms must be readily accessible for inspection and servicing.



# PITLESS LIVESTOCK SCALE (Floating Slab)



# PITLESS LIVESTOCK SCALE (Pier Structure)

