

## **Foreword**

The formulation of this national standard was initiated by the Agricultural Machinery Testing and Evaluation Center (AMTEC) under the project entitled “Development of Standards for Slaughterhouse Equipment for Large Ruminants” which was funded by the Department of Agriculture- National Meat Inspection Service (DA- NMIS).

This standard has been technically prepared in accordance with BPS Directives Part 3:2003 – Rules for the Structure and Drafting of International Standards.

The word “shall” is used to indicate mandatory requirements to conform to the standard.

The word “should” is used to indicate that among several possibilities one is recommended as particularly suitable without mentioning or excluding others.

In the preparation of this standard, the following documents/ publications were considered:

Anil, H. 2007. Religious Slaughter, The Outcomes of the DIALREL Project: Current Status and Perspectives. University of Bristol.

Baumeister, T., E.A. Avallone and T. Baumeister III. 1978. Marks’ Standard Handbook for Mechanical Engineers. 8th ed. McGraw- Hill, Inc.

Grandin, T. 1993. Teaching Principles of Behavior and Equipment Design for Handling Livestock. Journal of Animal Science. 71: 1065- 1070.

Grandin, T.G. 2005. Recommended Animal Handling Guidelines and Audit Guide for Cattle, Pigs and Sheep (2005 Edition). American Meat Institute Foundation. 2005.

Grandin, T. Answers to Questions About Cattle Insensibility and Pain During Kosher Slaughter and Analysis of the Agriprocessors Video. <http://www.grandin.com/ritual/qa.cattle.insensibility.html>. <accessed March 19, 2008>.

Kerns, R.W. 2005. Head Restraint for Animal Control Chute. United States Patent. Patent No. US7225759 B2.

PAES 411: 2000 Agricultural Structures – Slaughterhouse for Swine, Small and Large Animals – General Requirements

Regenstein, J.M. 2004. Kosher and Halal: Animal Welfare Issues. 6th Annual Animal Care and Handling Conference. Kansas City, MO: February 19, 2004

**Slaughterhouse Equipment –Stunning Box/ Knocking Pen – Specifications**

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**1 Scope**

This standard specifies the fabrication and performance requirements for a stunning box/knocking pen for large ruminants such as cattle and carabao.

**2 References**

The following normative documents contain provisions, which, through the reference in this text, constitute provisions of this National Standard:

- AWS D1.1: 2000** Structural Welding Code - Steel
- PAES 102: 2000** Agricultural Machinery – Operator’s Manual – Content and Presentation
- PAES 514: 2008** Slaughterhouse Equipment – Stunning Box/ Knocking Pen – Methods of Test

**3 Definitions**

For the purpose of this standard, the following definitions shall apply:

**3.1**

**chin lift**

part of the head gate which positions the head of the animal to facilitate stunning

**3.2**

**discharge gate**

part of the stunning box which opens to release the animal after stunning

**3.3**

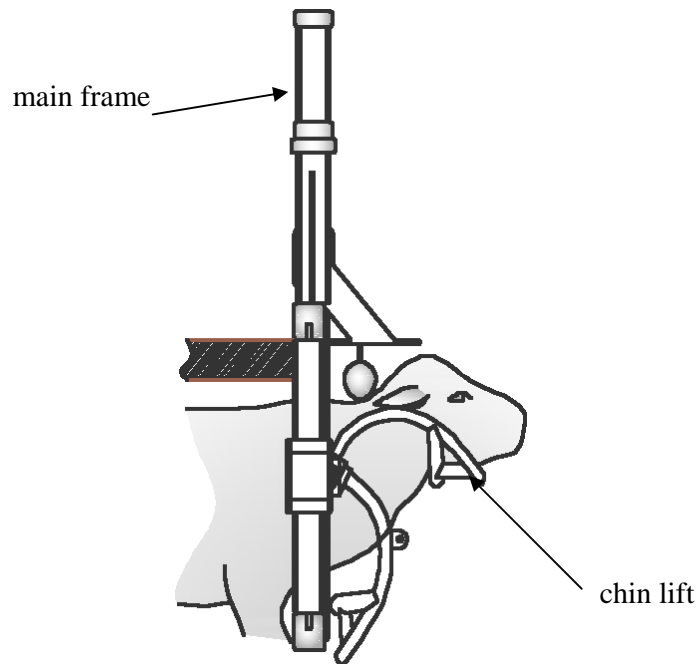
**entrance gate**

part of the stunning box where the animal enters

**3.4**

**head gate**

part of the stunning box which secures the head in restraining the animal (Fig.1)



**Figure 1. Head gate assembly**

### **3.5**

#### **large ruminants**

hoofed animals having rumen as part of their stomachs such as cattle, carabao and buffalo

### **3.6**

#### **stunning**

process of rendering an animal unconscious prior to sticking and bleeding

### **3.7**

#### **stunning box**

#### **knocking pen**

slaughterhouse equipment used to restrain the animal to facilitate stunning

### **3.8**

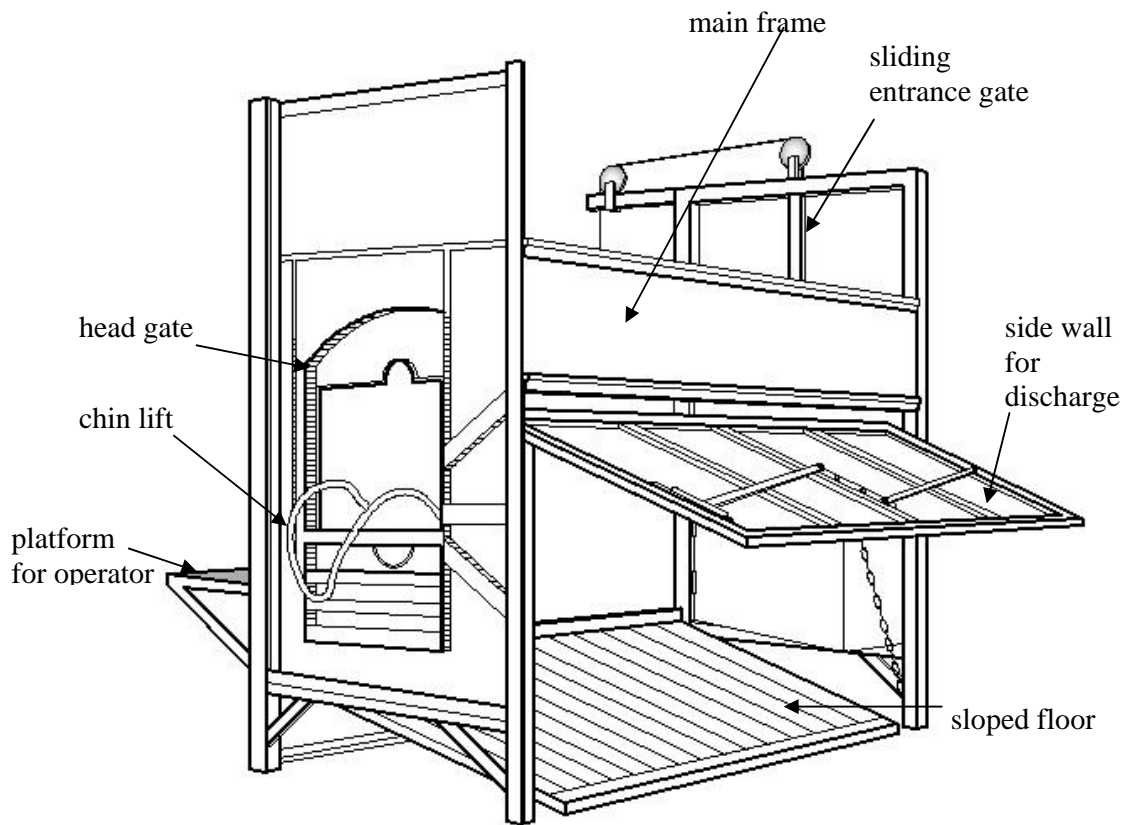
#### **tail pusher**

part of the stunning box which pushes the animal forward towards the head gate (Fig.2a and 2b)

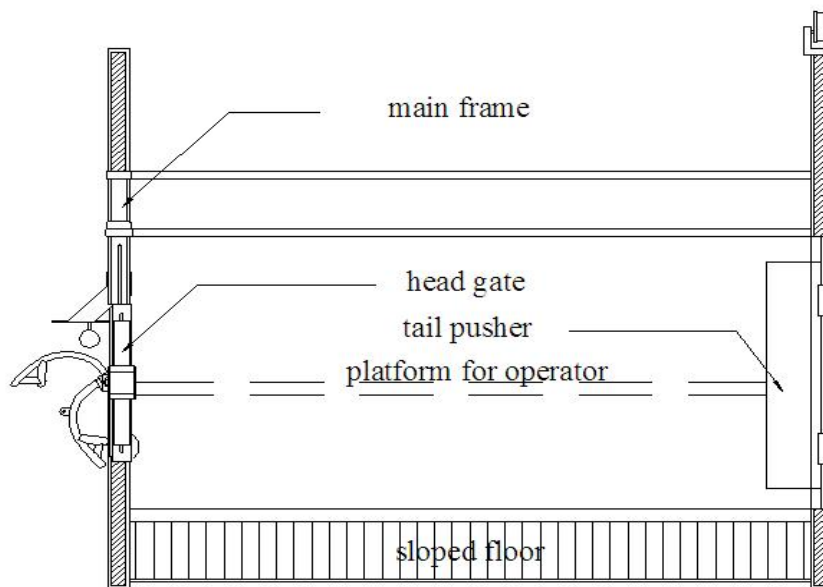
## **4 Classification**

### **4.1 Upright type**

Type of stunning box that resembles a small cage with open top and has a side gate for removal of stunned animal (Fig.2).



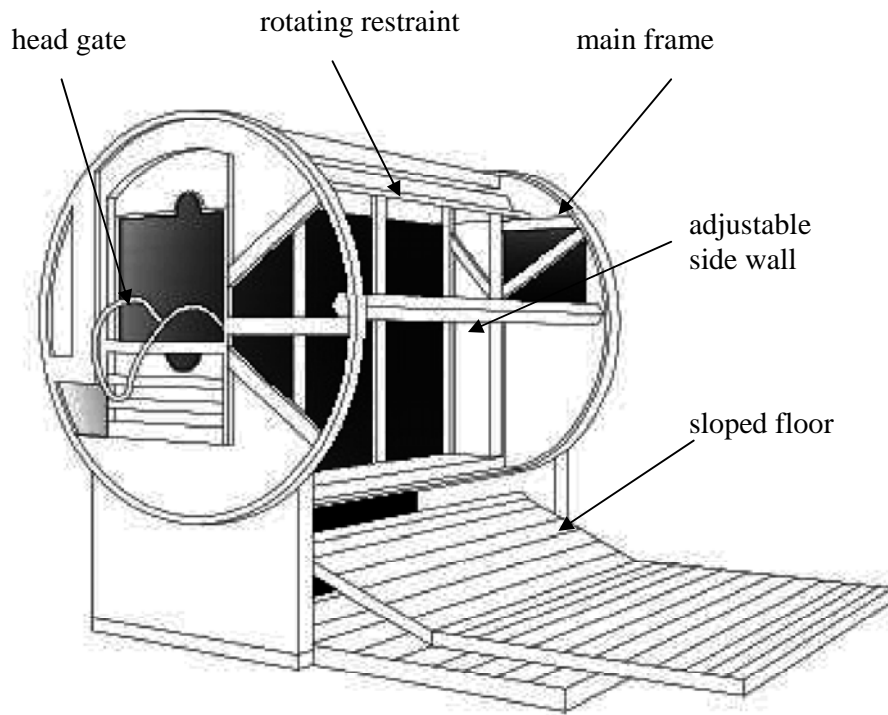
**Figure 2a. Upright stunning box (three-dimensional)**



**Figure 2b. Upright stunning box (cross-section)**

## 4.2 Rotating type

Type of stunning box that has adjustable side walls and back rest that supports the body of the animal during flipping (Fig.3).



**Figure 3. Rotating stunning box**

## 5 Principle of Operation

### 5.1 Upright type

The animal shall be allowed to enter stunning box through the entrance gate. As the entrance gate is closed, the tail pusher shall push the animal into the head gate. The chin lift of the head gate shall then be raised. The operator shall proceed on stunning. Stunned animal shall be removed from the stunning box through the discharge gate.

NOTE: For long horned ruminants, the head should not be engaged in the head gate and the tail pusher shall not be used accordingly.

## **5.2 Rotating type**

The same principle applies as that of the upright type of stunning box. However, the animal shall be secured by the adjustable inner walls of the stunning box. Once secured, the animal shall be stunned. The body of the animal shall be inverted on its back to allow cutting of the throat. After this process, the animal shall then be discharged through the opened top for automated operations or through the side wall for manual operations.

## **6 Fabrication Requirement**

Generally, the stunning box shall be made of non-corrosive materials (e.g. stainless steel 304 or higher).

### **6.1 Upright type**

**6.1.1** The upright type stunning box should consist of entrance gate, pen floor, head gate, tail pusher, side wall, counterweight and discharge gate.

**6.1.2** The stunning box shall be designed in such a way that it will hold the animal in upright position after being stunned.

**6.1.3** The stunning box shall have a side wall as discharge gate.

**6.1.4** The main frame shall be constructed from an I-beam or channel bar (e.g. 6 mm thickness) and shall be made of non-corrosive material.

**6.1.5** The inner side walls, the head gate, tail pusher and other parts of the stunning box that are in contact with the animal shall be made of non-corrosive materials (e.g. stainless steel 304 or higher) and shall have smooth surfaces and round edges.

**6.1.6** The pen floor shall be non-slip with slope of 7% inside the pen and 16% on the discharge side.

**6.1.7** Rubber pads shall be installed on the gates to reduce impact of closing.

**6.1.8** The counterweight shall be made of non-corrosive material. It shall be connected to the entrance gate or the side wall through non-corrosive chains or cable.

### **6.2 Rotating type**

**6.2.1** The rotating type stunning box should consist of the same components as that of the upright type but with the addition of adjustable inner walls, back rest and rotating restraint that are operated through the use of actuating cylinders.

**6.2.2** The hinges, entrance gate, rotating restraint, adjustable inner walls and back rest and other components shall be made of non- corrosive materials (e.g. stainless steel 304 or higher). The inner sides of the walls shall have smooth surfaces to avoid stress points on the animal's body.

**6.2.3** The main frame shall be constructed from an I-beam or channel bar (e.g. 6 mm thickness) and shall made of non-corrosive material.

**6.2.4** Pressure gauge of range 0 to 10 bars with at least 70 mm diameter shall be installed within the view of the operator.

**6.2.5** Silencers shall be installed to reduce the noise produced by a pneumatic cylinder.

### **6.3 Welding requirements**

All welded parts shall be water-tight and/or air-tight and smoothly polished and it shall pass the visual inspection criteria (AWS D1.1:2000) for discontinuity of material.

**6.3.1** There shall be no crack on the welded area.

**6.3.2** There shall be fusion between adjacent layers of weld metal and between weld metal and intermittent fillet welds outside of their effective length.

**6.3.3** Weld profiles shall be in its acceptable form.

**6.3.4** Welded joints shall not be less than 4mm site fillet weld.

**6.3.5** Undercut shall not exceed 2mm (1/16 inch) for any length of weld.

## **7 Installation Requirements**

**7.1** The main frame of the stunning box shall be rigidly attached on the wall of the slaughterhouse.

**7.2** The base of the stunning box should be mounted or bolted on an elevated flooring to yield the required sloping on the floor.

## **8 Performance Requirements**

The stunning box shall not produce a noise higher than 96dB(A).<sup>1</sup>.

### **8.1 Upright type**

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<sup>1</sup> Permissible noise exposures for four (4) hours of continuous operation as required by the Occupational Safety and Health Act (OSHA). Federal Register. Vol. 37. No.202. October 18, 1972.

- 8.1.1 The stunning box shall be able to secure the animal without giving stress to it.
- 8.1.2 The tail pusher shall help secure the animal.
- 8.1.3 Head gate shall not cause neck or head injuries on the animal during the restraining-stunning process.
- 8.1.4 The animal shall not be able to move its head once secured in the head gate.

## **8.2 Rotating type**

- 8.2.1 The rotating restraint shall be on its original upright position when an animal is not loaded in it.
- 8.2.2 The rotating restraint shall return to its original position after discharging the animal.
- 8.2.3 The pressure from the pump or compressor shall be sufficient to actuate the rotating restraint. The operating pressure shall comply with the specifications of the manufacturer.
- 8.2.4 The cylinder shall withstand the load and maintain its position whether upright or inverted.
- 8.2.5 The head gate shall not cause neck or head injuries on the animal after the restraining- stunning process.
- 8.2.6 The animal shall not be able to move its head once secured in the head gate.

## **9 Safety, Workmanship and Finish**

- 9.1 The stunning box shall have a rust-free finish and shall be free from sharp edges and shall be free from manufacturing defects.
- 9.2 The surfaces of the stunning box shall not be painted.
- 9.3 Safety locks shall be present to avoid accidents.

## **10 Warranty of Construction**

- 10.1 The stunning box construction shall be rigid and durable without breakdown of its major components within one year from the date of original purchase.
- 10.2 Warranty shall be provided for parts and services within one year after installation and acceptance by the customer.



## **11 Maintenance and Operation**

**11.1** An operator's manual which conforms to PAES 102, shall be provided.

**11.2** Grease points for lubrication of mechanical parts shall be provided.

**11.3** Food grade grease and oil should be used.

## **12 Testing**

Testing of the stunning box shall be conducted as installed in the slaughterhouse during commissioning. The stunning box shall be tested for performance in accordance with PAES 513.

## **13 Marking and Labeling**

**13.1** The stunning box pen shall be marked in English with the following information using a plate, stencil or by directly punching it at the most conspicuous place:

**13.1.1** Brand name or Registered trademark of the manufacturer (optional)

**13.1.2** Model and/or Serial number

**13.1.3** Maximum weight capacity (kg)

**13.1.4** Name, address and contact number of the manufacturer

**13.1.5** Country of manufacture (if imported)/ "Made in the Philippines" (if manufactured in the Philippines)

**13.2** Other additional markings shall be provided and shall include the name and address of the importer, if imported (optional).

**13.3** Safety/ precautionary markings shall be provided. Markings shall be stated in English or Filipino and shall be printed in red color with a white background.

**13.4** The markings shall have a durable bond with the base surface material and shall be water and heat resistant under normal cleaning procedures, it shall not fade, discolor, crack or blister and shall remain legible.