

PHILIPPINE NATIONAL STANDARD

**PNS/BAFS 311:2021
ICS 65.040.20**

Slaughterhouse Equipment – Large Ruminant Restrainer – Methods of Test



BUREAU OF AGRICULTURE AND FISHERIES STANDARDS

BPI Compound Visayas Avenue, Diliman, Quezon City 1101 Philippines

Trunkline: **(632) 928-8741 to 64 loc. 3301-3319**

E-mail: **info.dabafs@gmail.com**

Website: **www.bafs.da.gov.ph**

Slaughterhouse Equipment – Large Ruminant Restrainer – Methods of Test
PNS/BAFS 311:2021

Copyright © 2021 by Bureau of Agriculture and Fisheries Standards

All rights reserved. The mention of specific organizations or products, does not mean endorsement or recommendation from the Bureau of Agriculture and Fisheries Standards (BAFS) in preference to other of similar nature that are not included. The BAFS encourages the reproduction and dissemination of the materials upon request. Applications for permissions to reproduce or disseminate these materials and all other queries should be addressed to the publisher.

Published by:

Bureau of Agriculture and Fisheries Standards
BAFS Building, BPI Compound, Visayas Avenue, Diliman, Quezon City
info.dabafs@gmail.com | bafs@da.gov.ph
(+632) 8928 8756 to 65 local 3301 – 3325

ISBN 978-621-455-419-5 (PDF)

www.bafs.da.gov.ph

Foreword

In 2017, the Bureau of Agriculture and Fisheries Standards (BAFS) initiated the amendment of the Philippine Agricultural Engineering Standard (PAES) on Slaughterhouse Equipment – Stunning Box/Knocking Pen – Methods of Test (PAES 514:2008) upon the endorsement of the PAES Task Force. A Technical Working Group (TWG) was created through Special Order (SO) No. 487, series of 2017 (Creation of the TWG for the development of Philippine National Standard (PNS) for Cattle Restrainer and for the revision of PAES for Slaughterhouse and Lairage), SO No. 322, series of 2019 (Creation of Technical Committee [TC] and TWG for the development of PNS for Agriculture and Fishery Products and Machinery, Tools, and Equipment), and SO No. 280, series of 2021 (Creation of TWG for the Development of PNS for Agriculture and Fishery Products, Machinery, and Equipment). This TWG was composed of representatives from relevant government agencies, academe, and private sector. The revised PAES, which is now a BAFS PNS, aimed to provide guidance to national and local authorities, engineers, technical personnel, traders, manufacturers, processors, and other relevant stakeholders on the restrainer design for the slaughterhouse of large ruminants intended for human consumption. The final draft standard was reviewed and finalized through a series of stakeholder consultations and TWG meetings conducted via online platforms.

This PNS/BAFS includes the following significant changes compared to the previous PAES:

1. Replacement of the term “Stunning Box/Knocking Pen” to “Large Ruminant Restrainer”;
2. Amendment of the scope to specify restrainers installed in slaughterhouse;
3. Limitation of the scope for large ruminants to cover carabao and cattle only;
4. Inclusion of the Code of Good Animal Husbandry Practice for Beef Cattle and Carabao (PNS/BAFS 200:2017), and Republic Act No. 10631 (Animal Welfare Act of 1998) as normative references of the standard;
5. Inclusion of provisions for the General Condition for Test Inspection and the Role of Test Engineers;
6. Deletion of the numerical value for weight of the test material;
7. Alignment of the capacity of the restrainer with the design of the manufacturer;
8. Decrease on the minimum number of trials in testing the restrainer from three (3) to two (2);
9. Alignment of the standard with existing valid format of Test Reports and Data Sheets used by the Agricultural Machinery Testing and Evaluation Center (AMTEC);
10. Decrease on the maximum capacity of required weighing scale from 1000 kg to 700 kg;
11. Deletion of the digital timer and protractor as recommended instruments in Annex A;
12. Inclusion of other notable observations (e.g., presence of safety features/locks, vocalization, etc.) on the restrainer and ruminant during testing in Annex C; and
13. Deletion of Annex D Performance after Test Data Sheet.

This standard cancels and replaces the PAES 514:2008 Slaughterhouse Equipment – Stunning Box/ Knocking Pen – Methods of Test.

This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2.

Content

Foreword	i
1 Scope	1
2 Normative References	1
3 Terms and Definitions	2
4 General Conditions for Test and Inspection	2
5 Test Preparation	3
6 Pre-test observation	4
7 Performance test	4
8 Presentation of results	5
9 Test Report	5
Annex A	7
Annex B	8
Annex C	11
Bibliography	14

1 Scope

This standard specifies the methods of test and inspection for restrainer for large ruminants. Specifically, it shall be used to:

- 1.1 verify the mechanism, dimensions, materials, and accessories of the restrainer, and the list of specifications submitted by the manufacturer;
- 1.2 determine the performance of the equipment;
- 1.3 evaluate the safety features of the equipment; and
- 1.4 report the result of the tests.

2 Normative References

The following documents are referred to in the text in such a way that some or all their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Bureau of Agriculture and Fisheries Standards – Department of Agriculture (BAFS-DA). (2017). *Code of good animal husbandry practice for beef cattle and carabao*. (PNS/BAFS 200:2017)

BAFS-DA. (2020). *Agricultural structures – Slaughterhouse – Ruminants*. (PNS BAFS 306:2020)
http://bafs.da.gov.ph/bafs_admin/admin_page/pns_file/BPS%20End_SLH_Ruminants.pdf

BAFS-DA. (2021). *Slaughterhouse equipment – Large ruminant restrainer – Specifications*. (PNS/BAFS XXX:2021)

Republic of the Philippines. (2013). *An act amending certain sections of Republic Act No. 8485, otherwise known as “The Animal Welfare Act of 1998”* (Republic Act No. 10631).
<https://www.officialgazette.gov.ph/downloads/2013/10oct/20131003-RA-10631-BSA.pdf>

43 **3 Terms and Definitions**

44

45 For this standard, the following terms and definitions apply.

46

47 **3.1**

48 **live weight**

49 weight of ruminant prior to slaughter

50

51 **3.2**

52 **overall height**

53 distance between the horizontal supporting plane surface and the horizontal plane
54 touching the uppermost part of the restrainer

55

56 **3.3**

57 **overall length**

58 distance between the vertical planes perpendicular to the median plane of the restrainer,
59 each plane touching the front and rear extremities of the restrainer

60

61 **3.4**

62 **overall width**

63 distance between the vertical planes parallel to the median plane of the restrainer, each
64 plane touching the outermost point of the machine on its left and right sides

65

66 **3.5**

67 **vocalization**

68 ruminant sound such as bellowing in cattle

69

70 **3.6**

71 **test applicant**

72 manufacturer, fabricator, inventor, direct importer, legitimate distributor, dealer, or end-
73 user of the machine that officially applied for a test

74

75 **4 General Conditions for Test and Inspection**

76

77 **4.1 Role of the test applicant**

78

79 The test applicant shall submit the specifications and other relevant information for the
80 restrainer. They shall abide with the terms and conditions set forth by the official testing
81 agency, provide test animals, and shoulder other variable cost to carry out the test.

82

83

84

85

86 4.2 Role of the representative of the test applicant

87
88 An officially designated representative of the test applicant shall be skilled and shall be
89 able to operate, demonstrate, adjust, repair as the case maybe, and decide on matters
90 related to the operation of the restrainer.
91

92 4.3 Role of the test engineer

93
94 The certified test engineer shall lead the conduct of the performance testing in
95 accordance with the provisions of this standard. Furthermore, the test engineer shall
96 oversee other relevant activities prior to and after the conduct of the testing.
97

98 4.4 Test site conditions

99
100 The restrainer shall be tested as installed in the slaughterhouse. The site should have
101 ample provisions for animal handling, temporary storage, and workspace conforming to
102 PAES 306:2020 Agricultural Structures – Slaughterhouse for Ruminants.
103

104 4.5 Suspension/Termination of test

105
106 If during the test run and the restrainer encounters major breakdown or malfunction that
107 will affect the performance of the machine, the test may be suspended. If the restrainer
108 will not be able to continue operation, the test shall be terminated.
109

110 5 Test Preparation**111 5.1 Preparation of the large ruminant restrainer for testing**

112
113 The representative of the test applicant and testing agency shall check the restrainer to
114 ensure that it has been assembled and installed in accordance with the instruction of the
115 manufacturer. The official testing agency shall test the restrainer in accordance with the
116 performance requirements in PNS/BAFS XXX:2021 Slaughterhouse Equipment – Large
117 Ruminant Restrainer – Specifications.
118
119

120 5.2 Test instruments

121
122 The suggested list of minimum test instruments needed to carry out the restrainer test is
123 shown in Annex A. These instruments shall be calibrated regularly. It shall be physically
124 checked and cleaned for operation before and after each tests. A checklist of instruments
125 and materials to be used before arrival to and departure from the testing area shall be
126 prepared.
127
128
129

130 5.3 Test Animals

131
132 The large ruminant to be used for testing shall be at least two (2) heads, each with a live
133 weight depending on the capacity of the restrainer as specified by the manufacturer.
134 However, if the test animals are not conforming to the recommended quantity and
135 characteristics relevant to the restrainer, the test engineer shall not pursue the test.
136

137 6 Pre-test observation

138 6.1 Verification of specifications

139 The specifications claimed by the manufacturer and the physical details given in Annex
140 B shall be verified by the official testing agency. A stable and level surface shall be used
141 as reference plane for verification of dimensional machine specifications when fully
142 assembled and ready for use. The safety features of the restrainer shall be recorded.
143
144
145

146 6.2 Condition of the Test Animals

147
148 The parameters listed in Item C.1 of Annex C shall be obtained and recorded before the
149 test operation.
150

151 7 Performance test

152 7.1 Operation of the restrainer

153 The restrainer shall be tested by performing actual and proper restraining and stunning
154 of the test animal in accordance with the Republic Act 10631 (Animal Welfare Act of 1998)
155 and the PNS Code of Good Animal Husbandry Practice for Beef Cattle and Carabao
156 (PNS/BAFS 200:2017). The ruminant shall enter the restrainer through the entrance gate.
157 The head of the ruminant shall be secured in the head gate (as applicable) and shall be
158 released after stunning. The testing agency shall make and record all measurements.
159 The stunned ruminant shall be removed from the restrainer through the discharge gate.
160 After each test trial, the area shall be cleaned and prepared for the next test trial. This
161 procedure shall be repeated for the succeeding test trials.
162
163
164

165 7.2 Test trial

166
167 There shall be at least two (2) test trials. Each test trial should have one (1) ruminant as
168 test animal.
169

170 7.3 Data collection

171
172 The record sheet for all the data and information during the test is given in Annex C.
173 Observations to be taken during the performance test shall be recorded in this sheet.
174

175 **7.3.1 Noise level**
176

177 **7.3.1.1** The sound emitted by the machine, with and without load, shall be measured
178 using a sound level meter at the location of the operator or slaughterhouse personnel.
179 The noise level, expressed in decibel [dB (A)], shall be measured 50 mm away from the
180 ear level of the operator/s or slaughterhouse personnel.
181

182 **7.3.1.2** The sound emitted by the machine without load shall be measured using a sound
183 level meter at the location of the head gate.
184

185 **7.3.1.3** For each data to be taken, there shall be a minimum of five (5) observations.
186 Before recording the data, it should be ensured that the operations and other functional
187 characteristics have been stabilized. The time of recording shall be properly spaced
188 during the whole duration of the test trial.
189

190 **7.3.2 Pressure**
191

192 If applicable, the operating pressure, with and without load, shall be measured using a
193 pressure gauge.

194 **8 Presentation of results**
195

196 The restrainer specifications and the result of the tests shall be presented in tabular form
197 in which data shall be taken from Annexes B, C, and D. The observations made on the
198 restrainer while in operation shall be supported with photographs.
199

200 **9 Test Report**
201

202 The test report shall include the following information in the order given:
203

204 **9.1** Name of Testing Agency;
205

206 **9.2** Test Report Number;
207

208 **9.3** Title;
209

210 **9.4** Summary of Results;
211

212 **9.5** Purpose and Scope of Test;
213

214 **9.6** Methods of Test;
215

216 **9.7** Description of the Machine;
217

- 218 **9.8** Specifications;
219
220 **9.9** Results;
221
222 **9.10** Observations (include pictures); and
223
224 **9.11** Name/s, Signature/s and Designation/s of Test engineer/s.
225
226

227
228
229
230
231

Annex A
(informative)
Minimum list of test instruments

Table A - Minimum list of test instruments

Items		Quantity
A.1	Weighing scale Capacity: 700 kg	1
A.2	Tape measure (at least 5m)	1
A.3	Steel tape (at least 5m)	1
A.4	Vernier caliper Accuracy: 0.05 mm Capacity: at least 200 mm	1
A.6	Scientific calculator	1
A.7	Sound level meter	1
A.8	Pressure gauge Resolution: 0.1 bar Capacity: 15 bar	1

232
233

Annex B

(informative)

Specifications of large ruminant restrainer

234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258

Name of Test Applicant:

Address:

Tel. No.: _____

Name of Manufacturer:

Address:

Tel. No.: _____

General Information:

Classification: _____ Maximum Weight Capacity: _____

Serial No.: _____ Brand/Model: _____

Manufacture year: _____ Test Engineer: _____

Testing agency: _____ Animal Welfare Inspector: _____

Location of Test: _____ Date of Test: _____

Items*	Manufacturer's specifications	Verification by the testing agency
B.1 Type		
B.2. Main frame		
B.2.1 Overall dimensions, mm		
B.2.1.1 Length		
B.2.1.2 Width		
B.2.1.3 Height		
B.2.2 Material		
B.3 Entrance gate		
B.3.1 Dimensions, mm		
B.3.1.1 Height		
B.3.1.2 Width		
B.3.2 Material		
B.3.3 Mode of attachment		
B.3.4 Features		
B.4 Counterweight		
B.4.1 Mass, kg		
B.4.2 Material		

Items*	Manufacturer's specifications	Verification by the testing agency
B.5 Head gate		
B.5.1 Dimensions, mm		
B.5.1.1 Height		
B.5.1.2 Width		
B.5.2 Mode of attachment		
B.5.3 Material of main assembly		
B.5.4 Material of chin lift		
B.5.5 Features		
B.6 Discharge gate		
B.6.1 Dimensions, mm		
B.6.1.1 Length		
B.6.1.2 Height		
B.6.2 Material		
B.6.3 Mode of attachment		
B.6.4 Features		
B.7 Side wall		
B.7.1 Dimensions, mm		
B.7.1.1 Height		
B.7.1.2 Width		
B.7.2 Material		
B.8 Flooring		
B.8.1 Dimensions, mm		
B.8.1.1 Length		
B.8.1.2 Width		
B.8.2 Gap spacing, mm		
B.8.3 Material		
B.9 Rump pusher		
B.9.1 Type/Shape		
B.9.2 Dimensions, mm		
B.9.2.1 Length		
B.9.2.2 Width		
B.9.3 Material		
B.10 Discharge landing platform		
B.10.1 Length, m		
B.10.2 Width, m		
B.10.3 Gap spacing, mm		
B.10.4 Material		
B.11 Cylinder/s		
B.11.1 Type (pneumatic/hydraulic)		
B.11.2 Bore, mm		

Items*	Manufacturer's specifications	Verification by the testing agency
B.11.3 Stroke, mm		
B.11.4 Operating pressure, Pa		
B.11.5 Features		
B.12 Pressure gauge		
B.12.1 Type		
B.12.2 Location		
B.13 Cable/Chain		
B.13.1 Material		
B.13.2 Size		

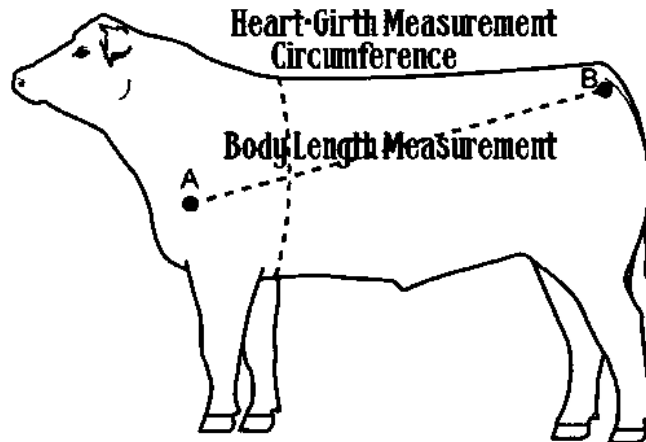
259

Annex C
(informative)
Performance Test Data Sheet

Test Trial No. : _____ Date : _____
 Test Engineers : _____ Location : _____
 Assistants : _____ Machine : _____
 Test Applicant : _____ Manufacturer: _____

Items	Trial		Average
	1	2	
C.1 Conditions of animal			
C.1.1 Animal			
C.1.2 Breed			
C.1.3 Girth, mm (refer to C.3)			
C.1.4 Weight, kg			
C.1.5 Length, mm (refer to C.3)			
C.2 Performance test			
C.2.1 Noise level, [dB(A)]			
C.2.1.1 Operator’s ear level			
C.2.1.1.1 Without load			
C.2.1.1.2 With load			
C.2.1.2 Location of head gate, without load			
C.2.2 Capacity, kg			
C.2.3 Operating pressure (if available), Pa			
C.2.3.1 Without load			
C.2.3.2 With load			

C.3 Ruminant Body Measurement



C.4 Other Observations

C.4.1 Presence of safety features/locks

C.4.2 Accessibility of grease points

C.4.3 Sturdiness of the main frame

C.4.4 Sturdiness of the discharge gate

C.4.5 Sturdiness of the slider

C.4.6 Sturdiness of the head gate

C.4.7 Sturdiness of the rump pusher

C.4.8 Welded and/or bolted parts/joints before and after the test operation

C.4.9 Failure or abnormalities that may be observed on the restrainer or its component parts during and after the test operation

C.4.10 Number of operators

C.4.11 Vocalizations

C.4.12 Ruminant's body movements

C.4.13 Others

Bibliography

- American Welding Society (AWS). (2000). *Structural welding code - Steel* (AWS D1.1: 2000)
https://www.academia.edu/10081213/AWS_D1_1_2000_Welding_Standard?email_work_card=view-paper
- Baumeister, T., E.A. Avallone and T. Baumeister III. (1978). *Marks' Standard Handbook for Mechanical Engineers*. 8th ed. McGraw-Hill, Inc.
<https://refacsmkn1crb.files.wordpress.com/2012/11/38102475-marks-standard-handbook-for-mechanical-engineers.pdf>
- Grandin, T.G. (2005). *Recommended animal handling guidelines and audit guide for cattle, pigs and sheep* (2005 ed). American Meat Institute Foundation.
<https://www.grandin.com/RecAnimalHandlingGuidelines.html>
- Grandin, T.G. (1993). *Teaching principles of behavior and equipment design for handling livestock*. *Journal of Animal Science*. (71), 1065- 1070.
<https://www.grandin.com/behaviour/principles/teach.html>

**Department of Agriculture (DA)
Bureau of Agriculture and Fisheries Standards (BAFS)
Technical Working Group (TWG) for the Philippine National Standard (PNS) for
Large Ruminant Restrainer – Specifications and Methods of Test**

Chairperson

Aurelio Delos Reyes Jr., Ph.D
College of Engineering and Agro- Industrial Technology (CEAT)
University of the Philippines Los Baños (UPLB)

Members

- | | | | |
|---|---|---|---|
| 1 | Engr. Mary Ann Evasco | 6 | Annalyn Carreos |
| 2 | Engr. Abbygail Jaylo | | Total Machinery and Trading |
| 3 | Engr. Maverick De Guzman
DA-Bureau of Agricultural and
Fisheries Engineering (BAFE) | 7 | Engr. Marivic Crusada
DA - National Meat Inspection
Service (NMIS) |
| 4 | Ronaldo Saludes, Ph.D
CEAT – UPLB | 8 | Eduardo Jose Manuel Jr., DVM
DA- Bureau of Animal Industry
(BAI) |
| 5 | Jovita Gonzales, Ph.D
DA- Philippine Council for Agriculture
and Fisheries (PCAF) | 9 | Engr. Fatima Joy Raytana
Engr. Ray Alipio
UPLB - Agricultural Machinery
Testing and Evaluation Center
(AMTEC) |

BAFS Management Team

Karen Kristine Roscom
Farlash Pancho
Engr. Em Bentulan
DA-BAFS

Advisers

Vivencio Mamaril, Ph.D / Myer Mula, Ph.D
DA-BAFS



BUREAU OF AGRICULTURE AND FISHERIES STANDARDS

BPI Compound Visayas Avenue, Diliman, Quezon City 1101 Philippines

T/ (632) 928-8741 to 64 loc. 3301-3319

E-mail: bafs@da.gov.ph

Website: www.bafs.da.gov.ph