THAI AGRICULTURAL STANDARD
TAS 4701-2013

SOYBEANS

National Bureau of Agricultural Commodity and Food Standards
Ministry of Agriculture and Cooperatives

Technical Committee on the Elaboration of Thai Agricultural Standard for Soybeans

1. Mrs. Wantana Tangpremsri
   Department of Agriculture  
   Chairperson

2. Mr. Narin Chatrungchewan
   Department of Foreign Trade, Ministry of Commerce  
   Member

3. Mrs. Pornthip Jeebjong
   Department of Internal Trade, Ministry of Commerce  
   Member

4. Mr. Thanabadee Rodsom
   Department of Livestock Development  
   Member

5. Mrs. Srisuda Taechasan
   Department of Agricultural Extension  
   Member

6. Mrs. Ing-on Punyakit
   National Bureau of Agricultural Commodity and Food Standards  
   Member

7. Associated Professor Somchai Jomduang
   Chiangmai University  
   Member

8. Mr. Supadej Chirasavinuprapand
   Food Processing Industry Club
   The Federation of Thai Industries  
   Member

9. Mr. Kamtorn Ekmetipunth
   Soybean and Rice Bran Oil Processor Association  
   Member

10. Mrs. Ubon Chamroonrat
    Thai Feed Mill Association  
    Member

11. Mr. Sikhant Pongsapipatana
    The Animal Husbandry Association of Thailand  
    Member

12. Mr. Sukkasem Wirax
    The Mae Taeng Land Settlement Agricultural Cooperative  
    Member

13. Mr. Somchai Pa-oblek
    Seed Research and Development Expert  
    Member

14. Mr. Nicom Lounsai
    Crop Production Expert  
    Member

15. Ms. Chutima Sornsumrarn
    Office of Standard Development,
    National Bureau of Agricultural Commodity and Food Standards  
    Member and Secretary
Soybeans are high in protein and oil content which are suitable for human consumption, processing for various kinds of food products as well as animal feed. Therefore, the Agricultural Standards Committee deems it necessary to establish the standard for soybeans so that soybeans used in the country meet the quality and safety requirements.

This standard is based on the following document:

NOTIFICATION OF THE MINISTRY OF AGRICULTURE AND COOPERATIVES  
SUBJECT: ESTABLISHMENT OF AGRICULTURAL STANDARD:  
SOYBEANS  
UNDER THE AGRICULTURAL STANDARDS ACT B.E. 2551(2008)

Whereas the Agricultural Standards Committee, by the resolution at the first session of  
B.E. 2556 (2013) on 6 March B.E. 2556 (2013), deems it necessary to establish  
an agricultural standard for soybeans as a voluntary standard in accordance with  
the Agricultural Standards Act B.E. 2551 (2008) to promote such agricultural commodity to meet  
its quality and safety standards.

By virtue of Section 5, Section 15 and Section 16 of the Agricultural Standards Act  
B.E. 2551 (2008), the Minister of Agriculture and Cooperatives hereby issues this Notification  
on Establishment of Thai Agricultural Standard for Soybeans (TAS 4701-2013), as voluntary  
standard, details of which are attached herewith.

Notified on 6 April B.E. 2556 (2013)

(Mr. Yukol Limlamthong)  
Minister of Agriculture and Cooperatives
THAI AGRICULTURAL STANDARD
FOR SOYBEANS

1 SCOPE

This Thai Agricultural Standard applies to commercial variety of soybean grains of *Glycine max* L. Merrill, family Leguminosae, for human consumption, animal feed or oil extraction.

2. QUALITY

2.1 Minimum requirements

(1) Grain colour of the variety characteristic,
(2) Free from abnormal odour,
(3) Moisture content not to exceed 13% by weight.

2.2 Classification

2.1.1 All classes of soybeans shall meet the minimum requirements as of Section 2.1. Classification of classes shall be based on grain size graded by sieve and protein content as in Table 1.

### Table 1 Classification of soybeans

<table>
<thead>
<tr>
<th>Items</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain size</td>
<td>Diameter not less than 4.8 mm.</td>
<td>Diameter not less than 4.5 mm.</td>
<td>Mixed size</td>
</tr>
<tr>
<td>Protein content</td>
<td>36% or above</td>
<td>Less than 36%</td>
<td>Less than 36%</td>
</tr>
</tbody>
</table>
3. DEFECTS

3.1 Definitions of soybean defects are as follows:

3.1.1 Foreign matter means other matters other than soybeans such as parts of stem, leaf, hull, stone, dirt, wood or other seeds.

3.1.2 Damaged kernel means soybean which has physical deterioration and/or deformity such as shrivelled, insect-damaged, and immature kernel.

3.1.3 Broken kernel means soybean with more than one-fourth of whole kernel removed or split.

3.2 Defect tolerances

The tolerances for each class are shown in Table 2.

<table>
<thead>
<tr>
<th>Table 2 Defect tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Section 3.2)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Defects</th>
<th>Tolerance limits in each class (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class 1</td>
</tr>
<tr>
<td>Foreign matter</td>
<td></td>
</tr>
<tr>
<td>Stone and dirt</td>
<td>1</td>
</tr>
<tr>
<td>not to exceed</td>
<td>not to exceed</td>
</tr>
<tr>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Damaged kernel</td>
<td>3</td>
</tr>
<tr>
<td>Broken kernel</td>
<td>3</td>
</tr>
</tbody>
</table>

4. SIZE TOLERANCES

Tolerances according to the unsatisfied size of class 1 and class 2 shall not be more than 10% by weight.

5. PACKAGING

Soybeans shall be packed in a clean container and be able to prevent external contamination. The containers shall be durable against handling from transportation, able to protect and maintain soybean quality as well as the contamination which may harm the consumers.
6. MARKING AND LABELLING

6.1 Retail container for direct consumers.

The following information shall appear on the container, package, fastening material or tag. They shall be easily and clearly visible without false or deceptive as follows:

(1) Name of the produce
   “Soybean grains” or “Soybeans” and soybean variety
(2) Class
(3) Net weight and date of production and/or packing
(4) Information of producer, and/or re-packer, and/or distributor
   Indicate name and address of the producer or re-packer or distributor. Name and address of head office of producer or re-packer or distributor may be provided. For imported soybeans, the importer’s name and address shall be indicated.
(5) Source of origin
   Indicate country of production, except local production for domestic market.
(6) Language
   In case of domestic market, label shall be in Thai. However, foreign language may be added. In case of exported produce, label can be in foreign language.

6.2 Non-retail containers

The following information shall be specified in the document accompanying the shipment, adhered on the label or container. They shall be legible, indelible and not be false or deceptive as follows:

(1) Name of the produce
   “Soybean grains” or “Soybeans” and soybean variety
(2) Class
(3) Net weight and date of production and/or packing
(4) Information of producer, and/or packer, and/or distributor
   Indicate name and address of the producer or packer or distributor and identification code (if any). Name and address of head office of producer or packer or distributor may be provided. For imported produce, the name and address of importer shall be indicated.
(5) Source of origin
   Indicate country of production, except produce for domestic market
(6) Language
In case of domestic market, label shall be in Thai. However, foreign language may be added. In case of exported produce, label can be in foreign language.

6.3 Certification mark

The use of certification mark shall be complied with the Ministerial Regulation on Characteristic of Mark, Application and Display B.E 2553 (2010) and the related Notifications of National Bureau of Agricultural Commodity and Food Standards.

7. CONTAMINANTS

Type and level of contaminants in soybeans shall be complied with the relevant laws.

8. PESTICIDE RESIDUES

Pesticide residues in soybeans shall be in compliance with the relevant laws and the requirements under the Thai Agricultural Standard on Pesticide Residues: Maximum Residues Limits (TAS 9002) and Pesticide Residues: Extraneous Maximum Residues Limits (TAS 9003).

9. HYGEINIC

Soybeans shall be harvested, handled including stored and transported with hygienic practices so as to prevent contamination that may be harmful to consumers.

10. METHODS OF ANALYSIS AND SAMPLING

10.1 Analytical methods are shown in Table 3:
### Table 3 Methods of Analysis

<table>
<thead>
<tr>
<th>Items</th>
<th>Methods of analysis</th>
<th>Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defects (section 3)</td>
<td>Take at least 1 kg of soybean sample then subsample to the final weight of 125 gm. Inspect foreign matter, damaged and broken kernel and calculate the percentage by weight.</td>
<td>Visual inspection</td>
</tr>
<tr>
<td>Moisture content (section 2.1)</td>
<td>ISO 6540 or other equivalent analytical methods shall be applied. In case other moisture analytical method i.e., moisture measuring device is used, it must be verified against the hot air oven method. The frequency of verification depends on various factors such as frequency of measurement, number of samples and error of measurement.</td>
<td>Gravimetry By hot air oven method</td>
</tr>
<tr>
<td>Protein content (section 2.2)</td>
<td>AOAC 955.04D or other equivalent analytical methods shall be applied.</td>
<td>Titrimetry, Kjeldahl digestion or other methods that are accurate and being accepted shall be used to analyse the percentage of protein content.</td>
</tr>
</tbody>
</table>

**Note:**

**Principles for the selection of other methods of analysis shall be as follows:**

1. The methods of analysis notified by national organization or international organization on standardization or published manual or publications which are internationally recognised.

2. The methods shall be validated by the collaborative study in compliance with the criteria of the recognisably international organization.

3. In case of neither point 1 nor point 2 is not available, methods of analysis shall be in accordance with the single laboratory validation which is internationally recognised.

### 10.2 Sampling

Sampling shall follow methods in Appendix B. The use of other essential sampling methods shall comply with relevant laws and regulations.
APPENDIX A

ILLUSTRATION OF SOYBEAN DEFECTS

Figure A.1 Normal kernels

Figure A.2 Damaged kernels

Figure A.3 Mouldy kernels

Figure A.4 Broken kernels
APPENDIX B

SAMPLING METHODS

B.1 DEFINITION

Definitions used for sampling of soybeans are as follows:

B.1.1 Lot means a quantity of soybeans delivered at one time and presumes the same characteristics such as origin, type, packing, packer and consigner.

B.1.2 Incremental sample means soybean randomly sampled at certain spots from each lot. The number of spots for sample is calculated by the methods given in Tables B1 and B2.

B.1.3 Aggregate sample or composite sample means total sample obtained from a combination of the incremental samples.

B.1.4 Laboratory sample means an aggregate sample which is mixed homogeneously and reduced in sufficient amount size for laboratory analysis or testing.

B.2 PROCEDURES

Sampling of soybeans shall be properly practiced to obtain a well representative of a lot. For incremental samples, sampling shall be picked regarding the number of spots/locations depends on a frequency according to pre-calculated information. The spots of sampling shall be distributed entirely the lot. Incremental samples are mixed homogenously for preparation of aggregate sample. An aggregate sample is reduced the size until its weight is double for laboratory sample. The laboratory sample is divided in two parts and placed in a sealed bag. One of sample bag is delivered to laboratory. The rest is kept for traceability in case of problem arising.

B.2.1 Sampling of product in packed units

The frequency of incremental samples taken from packed units shall be calculated by the following formula:

\[ F(n) = \frac{m_B m_I}{m_A m_p} \]

where;

\[ F(n) = \text{frequency of sampling from every (n) bag for incremental sample} \]

\[ n = \text{number of packed units per each sampling} \]

\[ m_B = \text{weight of soybeans of the lot in kg} \]
\( m_I = \) weight of incremental sample specified as 0.1 kg

\( m_A = \) weight of aggregate sample in kg; in general approximate at 3 kg

\( m_p = \) weight of soybeans in each bag in kg

Table B.1 Example of frequency for taking incremental samples in bag as of proper representative samples for laboratory testing. Samples were taken from lots of 25, 50 and 100 tonnes where incremental sample weight is 0.1 kg.

<table>
<thead>
<tr>
<th>Soybeans weight in each lot (kg)</th>
<th>Weight in each packed units (kg)</th>
<th>Frequency of incremental sampling (one sample from every n bag)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25,000</td>
<td>1</td>
<td>833</td>
</tr>
<tr>
<td>25,000</td>
<td>5</td>
<td>167</td>
</tr>
<tr>
<td>25,000</td>
<td>25</td>
<td>33</td>
</tr>
<tr>
<td>25,000</td>
<td>40</td>
<td>21</td>
</tr>
<tr>
<td>25,000</td>
<td>50</td>
<td>17</td>
</tr>
<tr>
<td>50,000</td>
<td>1</td>
<td>1,667</td>
</tr>
<tr>
<td>50,000</td>
<td>5</td>
<td>333</td>
</tr>
<tr>
<td>50,000</td>
<td>25</td>
<td>67</td>
</tr>
<tr>
<td>50,000</td>
<td>40</td>
<td>42</td>
</tr>
<tr>
<td>50,000</td>
<td>50</td>
<td>33</td>
</tr>
<tr>
<td>100,000</td>
<td>1</td>
<td>3,333</td>
</tr>
<tr>
<td>100,000</td>
<td>5</td>
<td>667</td>
</tr>
<tr>
<td>100,000</td>
<td>25</td>
<td>133</td>
</tr>
<tr>
<td>100,000</td>
<td>40</td>
<td>83</td>
</tr>
<tr>
<td>100,000</td>
<td>50</td>
<td>67</td>
</tr>
</tbody>
</table>

**Note:** Additional incremental samples can be taken in case of composite sample’s weight is less than 3 kg which is not sufficient for analysis in the laboratory.

B.2.2 Soybean sampling from bulk

Sampling number for laboratory analysis shall be agreed by the contract parties. Number and size of incremental samples are illustrated in Table B.2. If sample weight for laboratory analysis is not sufficient, number of incremental samples shall be increased.
Table B.2 Number of spots for sampling incremental sample in huge amount (i.e. truck, barge, train wagon, warehouse)

<table>
<thead>
<tr>
<th>Size of lot (tonnes)</th>
<th>Incremental sample (g)</th>
<th>Number of spots for incremental sample (spots)</th>
<th>Minimum sample for contaminant Analysis in laboratory (kg)</th>
<th>Minimum sample for other laboratory analysis (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 15</td>
<td>400-3,000</td>
<td>3</td>
<td>- Orchratoxin A and Aflatoxins: 10</td>
<td>1-3 According to specification for analysis</td>
</tr>
<tr>
<td>&gt;15- 30</td>
<td></td>
<td>8</td>
<td>- Pesticides, heavy metal and dioxins: 1</td>
<td></td>
</tr>
<tr>
<td>&gt;30-45</td>
<td></td>
<td>11</td>
<td>- Contaminants: 3</td>
<td></td>
</tr>
<tr>
<td>&gt;45-100</td>
<td></td>
<td>15</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;100-300</td>
<td></td>
<td>18</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;300-500</td>
<td></td>
<td>20</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>&gt;500-1,500</td>
<td></td>
<td>25</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

The detail of instruction for sampling equipment or device, methods of analysis and method of reducing size of aggregate sample to obtain laboratory sample shall be in accordance with ISO 24333:2009 Cereals and cereal product-sampling.