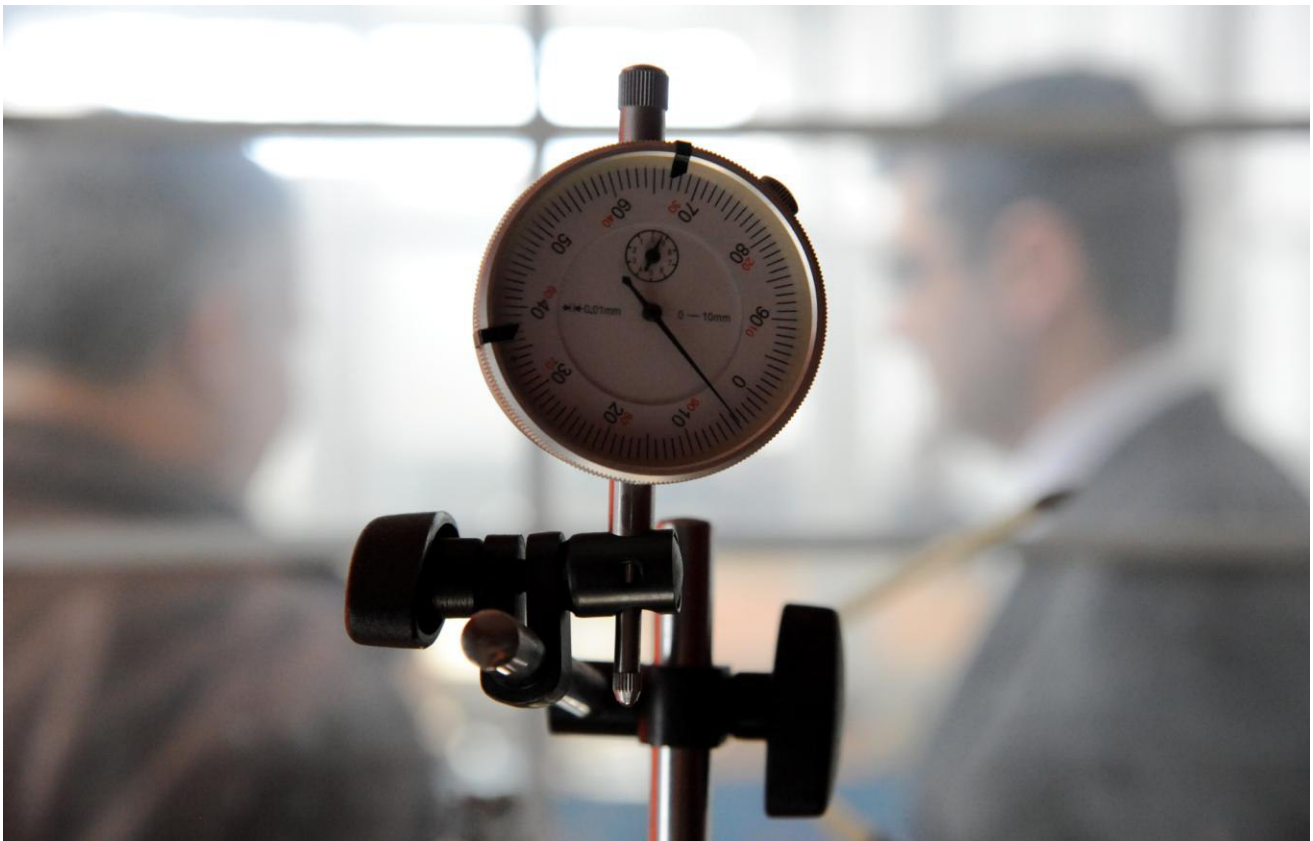


# Technical Inputs



National Standard of People's Republic of China

GB 5490-5539-85

Inspection of grain, oilseeds and vegetable oils

## **Imprint**

### **Published by the**

Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ) GmbH

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Bonn and Eschborn, Germany

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### **As at**

September 2014

### **Photo credits**

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On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)

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UDC (633.1+633.85+664.33) .001.4



**National Standard of the People's Republic of China**

GB/T

**GB 5490~5539-85**

519 and 5521 are annulled

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**Inspection of grain, oilseeds and vegetable oils**

**Issue date: Nov. 2, 1985**

**Implementation date: Jul. 1, 1986**

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**Approved by National Bureau of Standards (Predecessor of Standardization Administration of the People's Republic of China)**

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# National Standard of the People's Republic of China

Inspection of grain and oilseeds

Methods for sampling and sample reduction

UDC (633.1+633.85).001.4

B 5491-85

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This standard applies to commodity quality inspection of grain and oil.

## 1. Sampling tools

1.1 Sampler (grain probe): packing sampler and bulk sampler

1.1.1 Packing sampler

1.1.1.1 Large grain sampler: The full length is 75 cm. The length of mouth is 55 cm. The width of sampler is 1.5-1.8 cm. The head is in pointed or duckbilled head shape. The maximum outer diameter is 1.7-2.2 cm.

1.1.1.2 Small and medium-sized grain sampler: The full length is 70 cm. The length of mouth is 45 cm. The width of sampler is about 1 cm. The head is in pointed head shape. The maximum outer diameter is about 1.5 cm.

1.1.1.3 Power grain sampler: The full length is about 55 cm. The length of mouth is about 35 cm. The width of sampler is 0.6-0.7 cm. The head is in pointed head shape. The maximum outer diameter is about 1 cm.

1.1.2 Bulk sampler

1.1.2.1. Fine tube sampler is divided into two kinds according to the full length: 1 cm and 2 cm. There are 3 holes on the sampler. The length of each hole is about 15 cm and the width is about 1.5 cm. The length of head is about 7 cm. The outer diameter is about 2.2 cm.

1.1.2.2. Bulky tube sampler is divided into two kinds according to the full length: 1 cm and 2 cm. There are three holes on the sampler. The length of each hole is about 15 cm and the width is about 1.8 cm. The length of head is about 7 cm. The outer diameter is about 2.8 cm.

1.1.2.3. Electric suction sampler (not suitable for test of foreign matter)

1.2 Sampling shovel: mainly for flow grain sampling, oil sampling or package sampling.

1.3 Container: The necessary conditions of sample container are good air permeability performance, clean, no insects, no leakage and no pollution. Commonly used container includes sample tube, sample bag, sample bottle (e.g. wide mouthed bottle with frosted mouth), etc.

## **2. Sampling method**

2.1 Quantity represented by an inspection unit

During sampling, samples of the same species, batch, level, allocation, vehicle and vessel (cabin) are regarded as an inspection unit. The quantity of an inspection unit: generally no more than 200 t for small and medium-sized grain and oilseeds; no more than 50 t for large-sized grain and oilseeds.

2.2 Bulk sampling method

2.2.1 Warehouse sampling: for bulk grain or oilseeds, sampling point is set up according to the shape and size of heaps, and sampling is stratified according to the height of grain heap. The steps and methods are as follows:

2.2.1.1. Setting up point in each partition: The area of each partition does not exceed 50m<sup>2</sup>. Five points are set up in the center and four angles of each partition. If the number of partitions is two or more, the two points on the boundaries between two partitions will be regarded as the shared point (eight points together for two partitions, eleven points for three partitions and the like). The edged point of grain heap is set at about 50 cm away from the edge.

2.2.1.2. Stratification: the heap which is lower than 2 m will be divided into two layers: top and bottom; the heap whose height is between 2-3 m will be divided into

three layers: top, middle and bottom. The top layer is 10-20 cm below the surface of the grain heap, the middle layer is in the middle of the heap and the bottom layer is 20 cm above the bottom of the heap. If the height of the heap is between 3-5m, the heap will be divided into four layers and the like.

2.2.1.3. Sampling: sampling according to partitions and sampling points and by the sequence of from top to bottom. The sampling quantity shall be the same for each point.

2.2.1.4. For large grain and oilseeds (peanut, large broad bean, sweet potato piece, etc.) which are loose packed, according to the principle of "setting up points by partition", use the sampling shovel to sample out representative samples without selection from 10-20 cm under the surface of the grain heap.

2.2.2 Silo (store) sampling: stratified according to the height of silo (the same as 2.2.1.2. Divide each layer, according to the diameter, into inside circle (at the center), middle circle (at half the radius) and outside circle (about 30cm away from the warehouse side). If the diameter of the silo is less than 8m, set 1, 2 and 4 points (7 points together) at the inside, middle and outside circle respectively. If the diameter of the silo is more than 8 meters, set 1, 4 and 8 points (13 points together) at the inside, middle and outside circle respectively and sample by layer and point.

### 2.3 Packaging sampling method

2.3.1. For small and middle-sized grain and oilseeds, the sampling quantity should not be less than 5% of the total packages. The sampling quantity of wheat flour should not be less than 3% of the total packages. Sampling points of packages should be distributed evenly.

When sampling, the notch of the packaging sampler should be downward, insert the sampler from the oblique angle of one end to the other end of the package and then take out the sampler with the notch upward. The sampling times for each package shall be consistent.

2.3.2 Number of packages for sampling of large-sized grain and oilseeds (such as peanut, kernels, sunflower seed, castor beans, large broad beans, sweet potato slices, etc.): no less than 10 packages if the total number is less than 200. Add 1 package for

every 100 more packages if the total number is more than 200.

When sampling, 20% of prescribed sampling packages applies pouring-out method and 80% applies unpacking method.

Pouring-out method: put the sampling package on a clean plastic cloth or the ground, remove the sutures in the mouth of the package, take sampling package down slowly, catch up the lower corners of the package with both hands, lift about 50cm high, drag about 1.5m until entire poured out, use the sampling shovel to shovel out samples from the position corresponding with the middle and bottom of the package. The quantity of samples of each package or each point should be the consistent.

Unpacking method: Open the package by 3-5 suture needles; take out by the shovel the samples from the top of the package. The quantity of samples of each package should be consistent.

#### 2.4 Sampling method for flowing grain and oilseeds

For sampling of grain and oilseeds which are mechanically transported, determine the times and quantity of each time of the samples according to the amount and delivery times of grain and oilseeds to be inspected. Then sample from the terminal section of grain flow periodically.

#### 2.5 Sampling method for grain and oilseeds which are dispersedly collected

For sampling of grain and oilseeds which are dispersedly collected (including those are requisitioned), refer to the above-mentioned methods and sample flexibly in accordance with specific conditions. Make sure to get a representative sample.

2.6 Sampling for special purpose, such as inspection of grain condition, pest investigation, performance measurement of processing machinery and test of production rate, etc.: sample according to the requirements.

### **3. Method for Sample Reduction**

Procedure of evenly mixing up the original samples and then dividing the average samples or test samples is called sample reduction.

#### 3.1 Quartation

Pour the samples on a smooth flat desk or glass, lay out the samples into a square

with two sampling plates, and then shovel the samples from the left and right sides to the height of 10cm and pour down the samples towards the center. Repeat the operation in the other two directions (the center remains unchanged). Repeat the operation for four or five times until the samples are shaped into an isopachous square. Divide the samples into 4 equipotent triangles with the sampling plate. Remove samples of two double triangles. Repeat the above-mentioned operation for the remaining samples until the weight of the remaining samples of 2 double triangles is close to the requirement of test samples.

### 3.2 Method with sampler

Sampler is suitable for the sample reduction of medium, small-sized raw grain and oilseeds. The sampler consists of a funnel, sample reduction box and storage hopper etc. Samples are divided into two parts by the sample reduction box.

During sample reduction, stabilize the clean sampler, close the funnel switch, and install the storage hopper. Pour the sample into the funnel from 5cm above the mouth of the funnel. Level off the sample, turn on the funnel switch, pat the hull of the sampler when the sample is entirely poured out, close the funnel switch, Then pour the sample in the two storage hoppers into the funnel, and repeat the above steps twice. Pour the sample of one storage hopper according to the above method until the weight of the sample in the storage hopper is close to the required weight of test sample.



Additional information:

The standard is proposed by Ministry of Business of the People's Republic of China<sup>1</sup>.

The standard is drafted by Ministry of Business of the People's Republic of China  
Bureau of Grain Storage and Transportation.

Main drafters of this standard: Gao Xiuwu, Yang Haoran, Wu Yanxia, Lv Guifen.

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<sup>1</sup> Replaced by the present Ministry of Commerce of the People's Republic of China

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