codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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Agenda Item 6 **CX/PFV 10/25/7**
April 2010

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON PROCESSED FRUITS AND VEGETABLES

25th Session
Bali, Indonesia,
25 – 29 October 2010

PROPOSED DRAFT SAMPLING PLANS INCLUDING METROLOGICAL PROVISIONS FOR CONTROLLING MINIMUM DRAINED WEIGHT OF CANNED FRUITS AND VEGETABLES IN PACKING MEDIA

(AT STEP 3)

Codex Members and Observers wishing to submit comments on this proposal, including possible economic implications, should do so in conformity with the *Uniform Procedure for the Elaboration of Codex Standards and Related Texts* (Codex Alimentarius Procedural Manual) before **31 July 2010**. Comments should be addressed:	
to: US Codex Office, Food Safety and Inspection Service, US Department of Agriculture, Room 4861 South Building, 1400 Independence Ave., S.W., Washington, D.C. 20250-3700 USA Fax: +1.202.720.3157; E-mail: uscodex@fsis.usda.gov - ***preferred*** -	with copy to: Secretariat, Codex Alimentarius Commission, Joint FAO/WHO Food Standards Programme, Viale delle Terme di Caracalla, 00153 Rome, Italy Fax: +39 (06) 5705 4593 E-mail: codex@fao.org - ***preferred*** -

BACKGROUND

1. The 24th Session of the Committee on Processed Fruits and Vegetables considered proposed draft sampling plans including metrological provisions for controlling minimum drained weight of canned fruits and vegetables in packing media as prepared by France, who explained that in the standards for canned fruits and vegetables in packing media, there were provisions for minimum drained weight accompanied by criteria for lot acceptance and that the purpose of the sampling plans was to permit the contrrol of the minimum drained weight requirements. It was further explained that the proposed draft sampling plans was consistent with the criteria as set out in the General Guidelines on Sampling (CAC/GL 50-2004), was based on an AQL of 2.5 as recommended by the International Organization of Legal Metrology (OIML) and introduced a tolerable negative error, which provided for more flexibility while ensuring greater consumer protection than a sampling plan based on an AQL of 6.5.

2. Several delegations questioned the development of sampling plans for the determination of drained weight with an AQL of 2.5. It was noted that the current provisions for minimum drained weight and lot acceptance in standards for canned fruits and vegetables did not provide any evidence to create problems in international trade and that a mechanism to determine “unreasonable shortage” could be taken from the proposed draft sampling plans and added to the current provisions for lot acceptance. It was further noted that the AQL of 6.5 was widely accepted and understood.

3. The Committee agreed that the two approaches, that of provisions for minimum drained and lot acceptances as currently laid down in relevant standards for canned fruits and vegetables and that in the proposed draft sampling plans could be used to redraft the text. The Committee further agreed to return the proposed draft sampling plans to Step 2 for redrafting by a an electronic Working Group led by France and subsequent circulation for comments and consideration by the next session of the Committee.[1]

4. The Working Group revised the sampling plans as contained in Annex I. The rational for the revision is provided in Annex II. The List of Participants is presented in Annex III.

Request for comments

5. Codex Members and Observers are invited to comment on the ***proposed draft Codex Sampling Plans including metrological provisions for controlling minimum drained weight of canned fruits and vegetables in packing media*** as directed above. In making comments, particular attention should be paid to those provisions that may need further discussion by the Committee as outlined in the explanatory notes.

[1] ALINORM 09/32/27, paras. 78-82.

ANNEX I

PROPOSED DRAFT SAMPLING PLANS INCLUDING METROLOGICAL PROVISIONS FOR CONTROLLING MINIMUM DRAINED WEIGHT OF CANNED FRUITS AND VEGETABLES IN PACKING MEDIA[1]

1 SCOPE

The sampling plan applies to canned fruits and vegetables presented in a packing medium in rigid containers for which specific product standards require a declaration of minimum drained net weight. It specifies the conditions for the metrological control of the drained net weight of such products.

The sampling plan conforms to the Recommendations R87 of the International Organization of Legal Metrology (OIML) and the guidance in the Codex General Guidelines on Sampling (CAC/GL 50-2004).

The purpose of the metrological control of the content of prepackages is to ensure that the average drained net content of a lot is at least equal to the drained net weight declared on the prepackage labelling, and that the difference between the actual content of each container and the average content of the lot is as limited as possible.

(a) Control of the actual drained net content of each prepackage uses sampling plans by attributes whose principles are presented in the ISO 2859 standards.

(b) Control of average drained net content is a comparative test of the average drained net content of prepackages of a sample extracted from the lot under inspection; the statistical principle of this test is presented in ISO standards 2854-1976 and 3494-1976.

2 DEFINITIONS[2]

2.1 NOMINAL NET WEIGHT

Nominal net weight is the quantity of product in the prepackage, including packing medium, declared on the labelling.

2.2 DRAINED NET WEIGHT[1]

The drained net weight is the quantity of product in the prepackage less the packing media.

2.3 PACKING MEDIA

The packing media are defined in the Codex Guidelines on Packing Media for Canned Fruits (CAC/GL 51-2003) in addition to specific provisions in each commodity standard.

2.4 CAPACITY OF THE CONTAINER

The capacity of the container corresponds to the volume of distilled water at 20^{o} C that the sealed container holds when completely filled. For non-metallic rigid containers, such as glass jars, the drained weight of a product is calculated on the basis of the weight of distilled water at 20^{o} C that the container holds when completely filled, less 20 ml.

2.5 LOT

2.5.1 A lot is a definite quantity of some commodity manufactured or produced under conditions which are presumed uniform.

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[1] Throughout the document the term “weight” is used instead of “mass” as the terms “net weight” and “drained net weight” are recognized internationally, although not corresponding to the terms that should normally be used in a scientific context.

[2] Definitions: The only definitions given are those needed for this sampling plan; a full list of definitions is given in the General Guidelines on Sampling.

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In the context of this sampling plan, a lot comprises all prepackages of same nominal quantity, same kind, same manufacture, filled in the same location and the subject of control. The lot size is defined as follows:

2.5.2 When inspection of prepackages takes place at the end of a filling run, the lot size is equal to the maximum hourly production of the filling run, without limitation of size.

In other cases, the lot size is limited to 10 000 prepackages.

2.6 **AVERAGE OF A SAMPLE**: arithmetical average ($\bar{x}$) of the measurements of the drained weights (x_i) of each prepackage of the checked sample (n):

$$\bar{x} = \frac{\sum_{i=1}^{i=n} x_i}{n}$$

2.7 **TOLERABLE NEGATIVE ERROR**

2.7.1 Tolerable negative error of a prepackage is the maximum deficit between actual drained net weight and nominal drained net weight of the prepackage.

2.7.2 Tolerable negative error for the actual drained net weight of a prepackage is determined according to the following table:

Drained net weight in grams	**Tolerable negative error for drained net weight**	
	In % of Qn	**In grams**
5 to 50	18	-
50 to 100	-	9
100 to 200	9	-
200 to 300	-	18
300 to 500	6	-
500 to 1000	-	30
1000 to 10 000	3	-

For application of this table, the values calculated in units of mass of tolerable negative errors indicated in percentages should be rounded up to the nearest tenth of gram.

2.8 **ESTIMATED STANDARD DEVIATION**

The number (s) is equal to the square root of the quotient of the sum of the square deviations, between (x_i) the drained content of the prepacakage of line (i), and ($\bar{x}$) the arithmetic average of the (x_i), by (n-1).[3]

2.9 **FRACTIL OF ORDER 0.995 (g)**

It is the value ($x_{0.995}$) of random variable in order that the probability P ($x < x_{0.995}$) to have lower values than $x_{0.995}$ would be equal to 0.995, P ($x < x_{0.995}$) = 0.995. For a sample size equal to 20 (n = 20) the coefficient value of (g) is 0.640.

[3] Formula in Annex 1.

3 PROCEDURE FOR SAMPLING

3.1 SAMPLING

The sample prepackages are chosen at random. The size of sample (n) will correspond to the number of prepackages (or items) taken from the lot to be controlled or inspected.

3.2 SAMPLING PLAN

3.2.1 The sampling plan for the control of drained net weight is a sampling plan by attributes with an AQL of 2.5.

3.2.2 This sampling plan should only be used for lots comprising 100 or more items.

3.3 Control of actual content of a prepackage

3.3.1 To obtain the tolerable minimum content, the tolerable negative error is deducted from the corresponding nominal quantity of the prepackage. Prepackages of a lot with actual content below tolerable minimum content are considered as defectives.

3.3.2 **Destructive testing**: It is conducted according to the single sampling plan below and should only be used for lots of 100 or more items.

3.3.3 The number of controlled prepackages is given in the table below:

- if the number of defectives in a sample is less than or equal to the acceptance number, the lot is considered acceptable;

- if the number of defectives in the sample is equal to or higher than the rejection number, the lot is rejected.

Lot size	Sample size	Number of defectives	
		Acceptance number	Rejection number
100 to 10 000[4]	20	1	2

* For lots of more than 10 000 items, the lot is divided so that each segment has at least 100 and not more than 10 000 items. In this case, a lot is accepted if each of the segments is accepted by the inspection.

– For lots that have fewer than 100 items, the statistical control by sampling envisaged for lots of at least 100 to at most 10 000 items is not appropriate.

4 PROCEDURE OF CONTROL OF THE DRAINED WEIGHT

4.1 AVERAGE CHECKING

4.1.1 Average calculation

It consists in calculating the average ($\bar{x}$) of the drained weight of the 20 prepackages of the sample (n).

[4] There is no mathematical relationship between sample size (n) and lot size (N). Therefore, mathematically, there is no objection to taking a sample of small size to inspect a homogeneous lot of large size. The ratio n/N influences sampling error only when the lot size is small. However, in order to reduce the risk of accepting a large number of defective items, it is usual to increase the sample size as the lot size increases, especially when it is assumed that the lot is not homogeneous. Reference is made to the tables of ISO 2859 and ISO 3951 for correspondence between lot size and sample size.

4.1.2 **Criteria of acceptance**

– If the average ($\bar{x}$) is over the criteria of acceptance ($Q_n - 0.640$ s) : The batch is accepted.

– If the average ($\bar{x}$) is under the criteria of acceptance ($Q_n - 0.640$ s) : The batch is rejected.

4.1.3 **Criteria of acceptance or rejection of prepackage lot for control of the average** (***destructive testing)***

Lot size	**Sample size**	**Criteria**	
		Acceptance	**Rejection**
Whatever the size (≥ 100)	20	$\bar{x} \geq Q_n - 0.640$ s	$\bar{x} < Q_n - 0.640$ s

4.2 **DEFECTIVE CHECKING**

A defective unit is an unit whose drained weight is lower than (Qn – E) (Qn nominal drained weight – E tolerable negative error).

The number of defectives units is counted and compared with the acceptance criteria (cf 3.3.3).

4.3 **DECISION ON THE LOT**

The lot is accepted if it is accepted for the 2 checking (on average 4.1 and on defective 4.2)

5 RECOMMENDATIONS FOR THE MEASUREMENT OF DRAINED NET WEIGHT

5.1 The sampling and control of lots should preferably be conducted on the packing site or, failing that, at the point of import.

5.2 After manufacture, canned fruits and vegetables in a packing medium are subject to osmosis between the fruit or vegetable and the drained packing medium until a sufficiently stable equilibrium of mix is attained.

Sampling should therefore take place after such equilibrium has been attained, in other words at least 14 days after sterilization, pasteurization or any similar process, or when the operator considers the products ready for market. The time intervals recommended by the OIML and the WELMEC are as follows:

Product	**Time interval before control**	
	FROM	**TO**
Fruits, vegetables and other vegetable foodstuffs (except strawberries, raspberries, blackberries, kiwi and loganberries)	30 days after sterilization	Shelf life
Strawberries, raspberries, blackberries, kiwi, loganberries	30 days after sterilization	2 years after sterilization

ANNEX 1

FORMULA FOR THE CONTROL OF AVERAGE ACTUAL DRAINED NET WEIGHT OF ITEMS IN A PREPACKAGE LOT

A prepackage lot is considered acceptable for this check if the average

$\overline{x} = \frac{\sum x_i}{n}$ of actual contents "X_i" of "n" sample prepackages is greater than the value:

$$Q_n - \frac{s}{\sqrt{n}} \cdot t_{(1-\alpha)}$$

Where:

Q_n : nominal quantity of prepackages

n : number of sample prepackages for this check

s : estimated standard deviation of actual contents of the lot

$t_{(1-\alpha)}$: random variable of Student distribution with $\nu = n - 1$ degrees of freedom and confidence level $(1 - \alpha)$

By calling "X_{ii}" the measurement of actual content of the "iº" item of a sample of "n" items, we obtain:

The average of the sample measurements by calculating:

$$\overline{x} = \frac{\sum_{i=1}^{i=n} x_i}{n}$$

The estimated standard deviation "s" by calculating:

- the sum of the square of the measurements $\sum_{i=1}^{i=n} (x_i)^2$
- the square of the sum of the measurements $\left(\sum_{i=1}^{i=n} x_i \right)^2$ and $\frac{1}{n} \left(\sum_{i=1}^{i=n} x_i \right)^2$
- the corrected sum CS = $\sum_{i=1}^{i=n} (x_i)^2 - \frac{1}{n} \left(\sum_{i=1}^{i=n} x_i \right)^2$
- the estimated variance $v = \frac{CS}{n-1}$
- the estimated standard deviation is: $s = \sqrt{v}$

ANNEX 2

EXAMPLES OF CHECKING WITH DIFFERENT TESTS
Examples 1 to 4

Definitions

NQ: nominal quantity

$\bar{x}$: average

s: estimated standard deviation

E: Maximum acceptable error

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EXAMPLE 1

1st example: Palm heart, 250 g (nominal drained weight)

N°	Drained weight in g	N°	Drained weight in g	N°	Drained weight in g
1	253.5	8	248.3	15	243.5
2	250.3	9	246.89	16	241.3
3	246.3	10	237.6	17	246.4
4	243.2	11	255.8	18	246.3
5	240.1	12	242	19	253.8
6	244.4	13	253	20	246.1
7	247.2	14	242.9		

Statistical parameters of the sample in weight:

Average $\bar{x} = 246.89$ g	Estimated standard deviation s = 4.89116

1. **Average test only** (Section 7.1.4.2 Lot Acceptance - Codex Standard for Certain Canned Vegetables)

$\bar{x}$ is lower than the NQ (250 g): The batch is rejected

2. **Double test** - Average and minimum content:

2.1 ***Average check*** - Calculation of the acceptance criteria:

NQ – 0.640 s = 250 – 0.640 * 4.89116 = 246.8696 g

The estimated average for the sample is 246.89 g (> 246.86 g): The batch is accepted.

2.2 ***Defective checking***

- Definition of a defective unit (see Section 2.7.2 of the proposed draft)

Maximum acceptable error E = 18 g → **a prepackage is defective if its weight is under 232 g**

- The number of defective units (under 232 g) is 0.

2.3 ***Decision***

With an AQL of 6.5: The batch is accepted up to **3** defective units, and rejected from **4** defective units.

Here, the batch is accepted for the average checking, and accepted for the minimum content checking (defective checking), because the number of defective units is 0.

With a 2.5% AQL: The batch is accepted up to 1 defective unit, and rejected from 2 defective units.

Here, the batch is accepted for the average checking, and accepted for the minimum content checking.

3. **Comments** - This example shows:

– However the serie values are homogeneous (s = 4.89116), the lot is rejected with the average test only (see point 1);

– But the lot is accepted with the two AQL (2.5 and 6.5).

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EXAMPLE 2

2nd example: Mushrooms buttons and stems, 450 g (drained weight) *(average on the limit, average scattering)*

N°	Drained weight in g	N°	Drained weight in g	N°	Drained weight in g
1	445.50	8	438.00	15	465.00
2	432.70	9	426.10	16	508.60
3	416.00	10	436.10	17	439.10
4	454.10	11	474.90	18	423.50
5	431.70	12	412.00	19	436.90
6	430.10	13	456.20	20	431.20
7	456.90	14	448.40		

Statistical parameters of the sample in weight:

Average $\bar{x}$ = 443.15 g	Estimated standard deviation s = 22.1845 g

1. **Average test only** (Section 7.1.4.2 Lot Acceptance - Codex Standard for Certain Canned Vegetables)

$\bar{x}$ is lower than the NQ (450 g): The batch is rejected

2. **Double test -** Average and minimum content:

2.1 ***Average check*** - Calculation of the acceptance criteria:

NQ – 0.640 s = 450 – 0.640 * 22.1845 = 435.8 g

The estimated average for the sample is 443.15 g (> 435.8 g). The batch is accepted.

2.2 ***Defective checking***

- Definition of a defective unit (see Section 2.7.2 of the proposed draft):

Maximum acceptable error E = 27 g → **a prepackage is defective if its weight is under 423 g**

- The number of defective units (under 423 g) is 2.

2.3 ***Decision***

With an AQL of 6.5: The batch is accepted up to **3** defective units, and rejected from **4** defective units.

Here, the batch is accepted for the average checking, and accepted for the minimum content checking (defective checking), because the number of defective units is 2.

With a 2.5% AQL: The batch is accepted up to 1 defective unit, and rejected from 2 defective units.

Here, the batch is accepted for the average checking, and rejected for the minimum content checking, because the number of defective units is 2.

3. **Comments** - This example shows:

- There are benefits of a double test with a 2.5% AQL: The average criteria is related to the standard deviation (scattering of the batch). The more important is the standard deviation (s = 22.1845 g), the lower is the average criteria. This is an explanation for the acceptance of the lot with the 6.5% AQL, and for the rejection of the batch with a 2.5% AQL;
- It could be pointed out that the batch is rejected after the check of the average only, and after the sampling plan with an AQL = 2.5;
- With an AQL of 6.5 the lot is accepted when the deviations are very important (gap from 2 g and 38 g / Qn = 450 g).

EXAMPLE 3

3rd example: Mushrooms, 450 g (drained weight) *(tolerable average, high scattering)*

N°	Drained weight in g	N°	Drained weight in g	N°	Drained weight in g
1	465.50	8	450.00	15	490.00
2	442.70	9	420.00	16	530.00
3	416.00	10	430.10	17	433.10
4	464.10	11	495.90	18	433.50
5	421.00	12	422.00	19	428.90
6	435.10	13	466.20	20	431.20
7	466.90	14	458.40		

Statistical parameters of the sample in weight:

Average $\bar{x}$ = 450.03 g	Estimated standard deviation s = 29.281 g

1. **Average test only** (Section 7.1.4.2 Lot acceptance - Codex Standard for Certain Canned Vegetables)

$\bar{x}$ is higher than the NQ (450 g): The batch is accepted.

2. **Double test** - Average and minimum content:

2.1 ***Average check*** - Calculation of the acceptance criteria:

NQ – 0.640 s = 450 – 0.640 * 29.281 = 431.27 g

The estimated average for the sample is 450.03 g (> 431.27 g). The batch is accepted.

2.2 ***Defective checking***

- Definition of a defective unit (see Section 2.7.2. of the proposed draft):

Maximum acceptable error E = 27 g → **a prepackage is defective if its weight is under 423 g**

- The number of defective units (under 423 g) is 4.

2.3 ***Decision***

With an AQL of 6.5: The batch is accepted up to **3** defective units, and rejected from **4** defective units.

Here, the batch is accepted for the average checking, and rejected for the minimum content checking (defective checking), because the number of defective units is 4.

With a 2.5% AQL: The batch is accepted up to 1 defective unit, and rejected from 2 defective units.

Here, the batch is accepted for the average checking, and rejected for the minimum content checking, because the number of defective units is 4.

3. **Comments** - This example shows:

- Some units have a too low content because of the high scattering (s = 29.281 g), but the batch is accepted for the average checking. Now, let's imagine the batch values go down. With such a standard deviation, an average lack of 19.48 g under 450 g would be accepted (0.640*30.348 = 19.48), that is to say a shortage average of 4% of the nominal quantity;
- This example shows that the conformity to the average is not a sufficient condition;
- Here, the deviations are important.

EXAMPLE 4

4th example: Asparagus, 250 g (drained weight) *(average to low, little spread)*

N°	Drained weight in g	N°	Drained weight in g	N°	Drained weight in g
1	256	8	248.3	15	243.5
2	250	9	245.7	16	246
3	246.3	10	242	17	246.4
4	243.2	11	255.8	18	246.3
5	240.1	12	242	19	251
6	244.4	13	247	20	249
7	247.2	14	242.9		

Statistical parameters of the sample in weight:

Average $\bar{x} = 246.65$ g	Estimated standard deviation s = 4.222 g

1. **Average test only** (Section 7.1.4.2 Lot Acceptance - Codex Standard for Certain Canned Vegetables)

$\bar{x}$ is lower than the NQ (250 g): The batch is rejected.

2. **Double test** - Average and minimum content:

2.1 ***Average check*** - Calculation of the acceptance criteria:

NQ – 0.640 s = 250 – 0.640 * 4.222 = 247.29 g

The estimated average for the sample is 246.65. The batch is rejected.

2.2 ***Defective checking***

- Definition of a defective unit (see Section 2.7.2 of the proposed draft):

Maximum acceptable error E = 18 g → **a prepackage is defective if its weight is under 232 g**

- The number of defective units (under 232 g) is 0.

2.3 ***Decision***

With an AQL of 6.5: The batch is accepted up to **3** defective units, and rejected from **4** defective units.

Here, the batch is rejected for the average checking, and accepted for the minimum content checking (defective checking), because the number of defective units is 0.

The batch is rejected

With a 2.5% AQL: The batch is accepted up to 1 defective unit, and rejected from 2 defective units.

Here, the batch is rejected for the average checking, and accepted for the minimum content checking, because the number of defective units is 0.

The batch is rejected

3 **Comments** - This example shows:

– The average is too low, and the standard deviation is quite low. For that reason the choice of a 2.5% or 6.5% AQL did not change the conformity results.

ANNEX II

EXPLANATORY NOTES ON THE REVISED SAMPLING PLANS

GENERAL CONSIDERATIONS

The revised sampling plan as currently proposed is based on the previous draft presented at the last session of the Committee (CX/PFV 08/24/7), comments submitted at that session, as well as additional comments provided to France, as leading country of the electronic Working Group on Sampling Plans, by Australia, Poland, Thailand and the United States of America.

SPECIFIC CONSIDERATIONS

Background

I-1 The document sent to the Working Group in March 2009 brought some information on the different options in order to choose a sampling plan for controlling minimum drained weight of canned fruits and vegetables in packing media.

Some of the commenters prefer a sampling plan based on an AQL of 6.5 which seems less restrictive than a sampling plan based on an AQL of 2.5. In addition, they wished a simplification of the document and a proposal less restrictive than the existing provisions, in order to achieve a suitable balance between consumer and producer interests.

I-2 The document was sent for another round of comments in September 2009. A new simplified proposal was presented with different examples in order to explain the consequences of the choice of the method of inspection:

- Average check only with the question of the definition of an “unreasonable shortage”.

- Double check: average and minimum content.

Comments received can be resumed as follows:

- The current method, as it has been operating, is simple and easily understood. Member countries have not indicated that it has been the cause of problems in international trade;

- The proposal is a more scientific approach to sampling of canned fruits and vegetables in packing medium than the current method of inspection that is based on the measure of the average. It would be beneficial for producers, consumers, and for international trade in canned fruits and vegetables if there is a control of the minimum drained weight in these products. A good outcome is achievable if greater specificity and precision in minimum drained weights are adopted, without imposing unreasonable complexity in testing and verification;

- They support the adoption of a sampling plan with an AQL of 6.5;

- The proposed draft standard relates to quality of product rather than to food safety issues, hence, it is important to achieve a suitable balance between consumer and producer interests, and between consistency of sampling and unnecessary complexity;

- It is suggested that additional work be done to provide guidance in Section 3.3.3 regarding destructive testing on suitable schemes for sampling lots with less than 100 items;

- The current proposal appears to have regional influences which would not be in keeping with a worldwide standard;

- The limited resources of the CCPFV would be more effectively applied to work which a greater consensus agrees is needed;

- Drained weight requirements or recommendations may vary for the same product due to maturity, count, size of units and size of containers;

- By applying sampling plan with AQL 6.5, the value of the standard deviation of the drained weight was low and within the manufacturer's specification. The manufacturers shall not have any problem with maintaining the low value of the standard deviation.

I. THE PROPOSED DRAFT SAMPLING PLANS

1- The bases of the draft

- The 30th Session of the Executive Committee approved the development of sampling plans including metrological provisions for controlling minimum drained weight of canned fruits and vegetables in packing media as new work for the Committee.

- The Principles for the Establishment or Selection of Codex Sampling Procedures (Section II, Procedural Manual, Codex Alimentarius Commission) indicates that:

  - Codex Methods of Sampling are designed to ensure that fair and valid sampling procedures are used when food is being tested for compliance with a particular Codex commodity standard. The sampling methods are intended for use as international methods designed to avoid or remove difficulties which may be created by diverging legal, administrative, and technical approaches to sampling, and by diverging interpretation of results of analysis in relation to lots or consignments of foods, in the light of the relevant provision(s) of the applicable Codex standard.

  General Instructions for the Selection of Methods of Sampling:

  (a) Sampling methods described in the General Guidelines or official methods of sampling elaborated by international organizations occupying themselves with a food or a group of foods are preferred. Such official methods may be written using the General Guidelines on Sampling (CAC/GL 50-2004) when attracted to Codex standards.

  (b) When selecting appropriate sampling plans: Table 1 in the General Guidelines may be utilized.

  (c) The appropriate Codex Commodity Committee should indicate, the basis on which the criteria in the Codex commodity standards have been drawn up,

  (d) Instructions on the procedure for the taking of samples in order to ensure that the sample taken is representative of the consignment or of the lot (size and number of individual items, administrative measures for taking and handling the sample.)

  (e) The sampling protocol may include the statistical criteria to be used for acceptance or rejection of the lot on the basis of the sample and the procedures to be adopted in cases of dispute

- The proposed method is in accordance with the General Guidelines on Sampling and is consistent with the international recommendations of OIML (International Organization of Legal Metrology). The double requirement (check of the average and check of the minimum content) is included into the OIML Recommendation R.87. In addition, the OIML recommends an AQL of 2.5.

2 The aims of the draft

- The purpose of the Codex Alimentarius is to protect the health of consumers and to ensure fair practices in the food trade.

- The present method of inspection of the minimum drained weight is mainly based on the measure of the average: that must not be lower than the minimum drained weight (nominal quantity indicated on the label). In addition, each individual container must not have unreasonable shortage.

  Lots of canned vegetables which do not comply with the requirement of the minimum drained weight because of the variability of the "unreasonable shortage" do not comply with these objectives, because the "unreasonable shortage" is freely fixed by operators or inspectors. Consequently, the decision to accept or to refuse a lot depends on the operator or the Member State. This situation does not allow for ensuring a loyal competition.

3 The content of the draft

The proposed method:

- Is in conformity with the requirements of the General Guidelines on Sampling: The size of the lot and the size of the sample are defined, the misleading prepackage is defined and there is a determination of the acceptance number (which permits to specify what the "unreasonable shortage" is).

  In addition, the Guidelines recommend that commodity committees establish sampling plans of comparable effectiveness to those recommended in the Guidelines on Sampling.

- **It is a sampling plan for inspection by attributes**: This method evaluates the quality of a lot and consists of classifying each increment of the sample as a conforming or non conforming characteristic or attribute (here the minimum drained weight), depending on whether the Codex standard specification is respected or not.

- The statistics methods allow verifying that the quality of the lot, expressed as % of defective items, is at least equal to the AQL of the sampling plan. The AQL is the level of quality expressed as % of defective items accepted by the plan with a high probability. The AQL of 2.5 is in conformity with the recommendation of the International Organization of Legal Metrology (OIML R.87) which recommends an AQL of 2.5 for the inspection of the weight. The choice of an AQL of 2.5 aims at decreasing the standard deviation and obtaining a good quality level which brings better guaranties to the consumer, and allows for compliance with the standards requirements, without intolerable charges to the manufacturer.

- In order to take into account the variability of products (maturity, count, size of units), into the draft the maximum acceptable error is the double of the one included into the OIML R.87;

- The current method needs to make an average of all samples, therefore, it is necessary to weight "a certain number" of units to determine the "unreasonable shortage" (not defined).

- The proposed method is not more complex but more complete and conforms to the Codex sampling procedures. It needs to make an average of all units (20 units for a lot of 10000 units) in order to make an average checking and to make an easy calculation of the minimum content and determination of the number of defectives

II. WAITING QUESTIONS

II.1 – The AQL of 6.5 or 2.5

The AQL is a level of quality expressed as % of defective items, accepted by the plan with a high probability.

Table 2A of the ISO STANDARD 2859, Part 1, compares the consumer's risk (CR) and the producer's risk (PR) when the AQL is 6.5, or 2.5. It shows that:

- ✓ with an AQL of 6.5, a sample (n) =20, and the acceptance criteria (c) =3, the PR (or P95) = 7.13%, and the CR (P10) = 30.4 %;
- ✓ with an AQL of 2.5, a sample (n) =20, and the acceptance criteria (c) =1, the PR (P95) = 1.8% and the CR (P10) =18.1 %;

Conclusion:

-The producer's risk (PR) is not very increased by the choice of an AQL of 2.5;

-The consumer's risk is increased by an AQL of 6.5 and the producer's risk is not intolerable.

In this regard, paragraph 26 of CX/PFV 08/24/7 is reproduced here below:

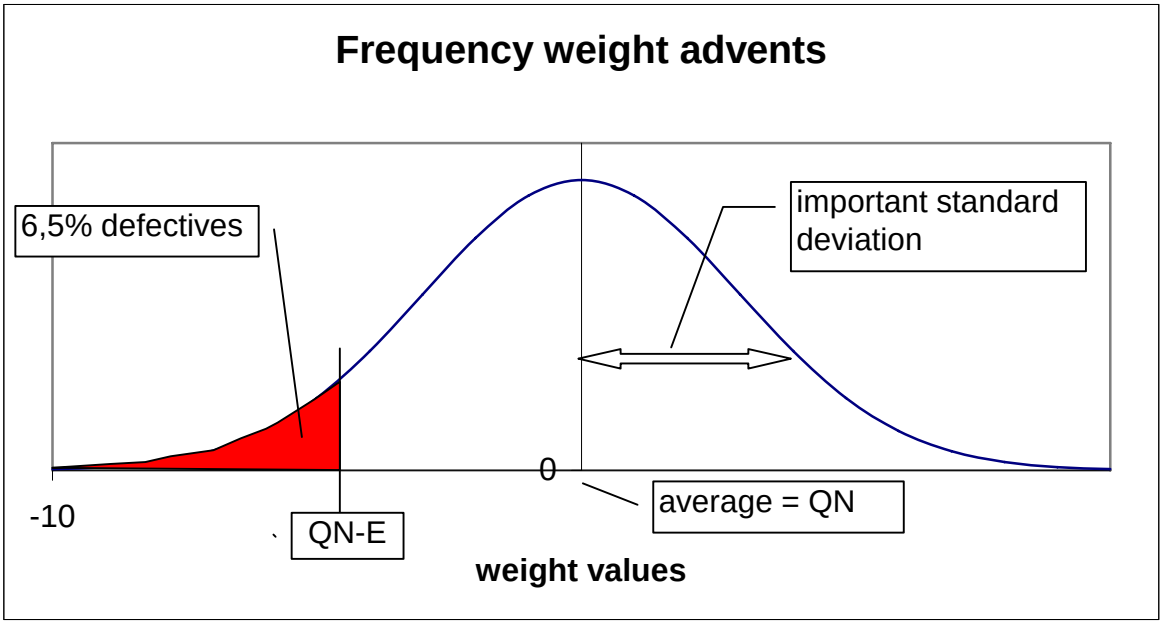
26. OIML recommendation R87 has only retained plans with an AQL of 2.5 for the control of net mass. An AQL of 2.5 is also identified in the WELMEC recommendations for the control of drained net weight. A comparison of the effectiveness of the two plans (AQL = 6.5 and AQL = 2.5) is set out in section 4.2 of the Codex general guidelines on sampling, in particular sections 4.2.2.2 and 4.2.2.3. The following table provides a brief summary for a normal inspection plan.

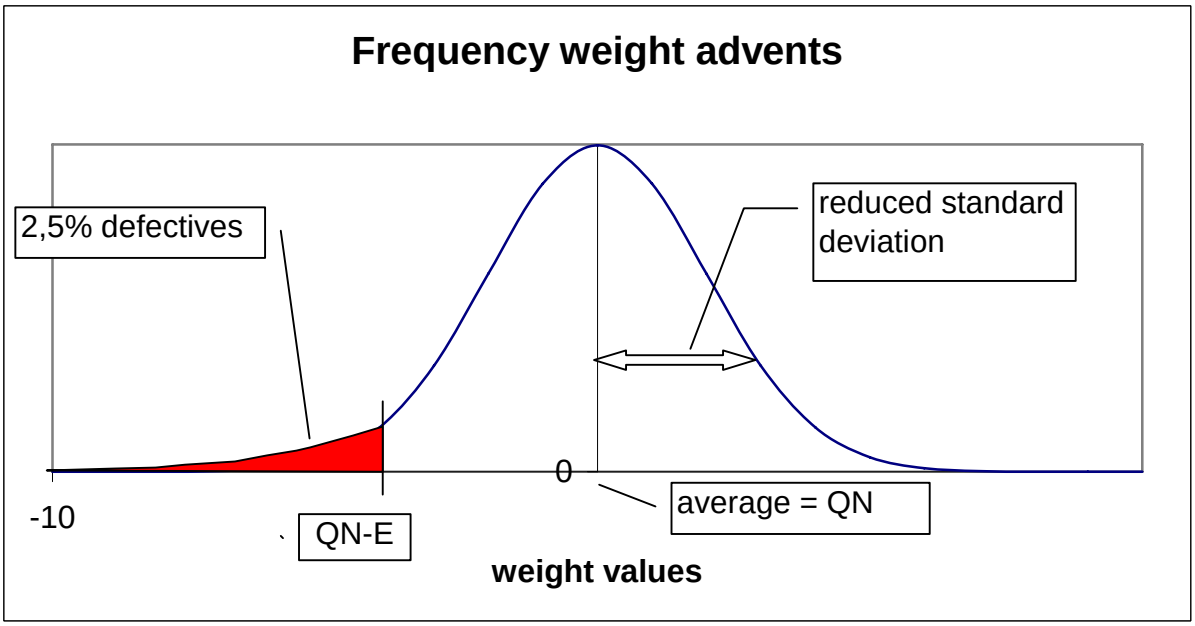
AQL 2.5	*n = 5 c=0* *P95 = 1.02 %* *P50 = 12.2 %* *P10 = 36.9 %*	*n = 20 c = 1* *P95 = 1.8 %* *P50 = 8.25 %* *P10 = 18.1 %*	*n = 32 c = 2* *P95 = 2.59 %* *P50 = 8.25 %* *P10 = 15.8 %*	*n = 50 c = 3* *P95 = 2.77 %* *P50 = 7.29 %* *P10 = 12.9 %*

AQL 6.5	*n = 8 c=1* *P95 = 2.64 %* *P50 = 20 %* *P10 = 40.6 %*	*n = 13 c = 2* *P95 = 6.63 %* *P50 = 20 %* *P10 = 36 %*	*n = 20 c = 3* *P95 = 7.13 %* *P50 = 18.1 %* *P10 = 30.4 %*	*n = 32 c = 5* *P95 = 8.5 %* *P50 = 17.5 %* *P10 = 27.1 %*	*n = 50 c = 7* *P95 = 8.2 %* *P50 = 15.2 %* *P10 = 22.4 %*

In addition, it is necessary to consider that with an AQL of 2.5, the variability of products is taken in consideration with the double of the maximum acceptable error. Furthermore, this variability is included into the provisions of the standards for canned fruits and vegetables: The minimum drained weight (MDW) adopted takes already into account the size units with lesser MDW for big units, for example, as half pear (53 %) or whole pears (50%) than for small size units as very small peas (66 %).

The two curves following explain the differences between the 2 cases (AQL of 6.5 or AQL of 2.5:





2 - The method without imposing unreasonable complexity in testing and verification:

- The current method needs to make an average of all samples, so, it is necessary to weigh "a certain number" of samples and to determine the unreasonable shortage (not defined).

- The proposed method is not more complex, it is complete and conform to the Codex sampling procedures. It needs to make an average of all samples (20) and to made an easy calculation of the minimum content and determination of the number of defectives. The calculation could be automatized, and the inspectors do not have to use the formula which are in Annex 1 of the proposed draft. These formula allow to explain the mathematical bases which permit to establish the statistical base of the metrological control.

- **The average** checking consists of verifying that the average of the drained weights of the 20 prepackages of the sample should not be lower than the nominal drained weight. This method leans on the fact that the mathematic law of the average scattering of a sample (size n) follows roughly a curve of a Gauss law from n=5. So from a sample size of 10, it is estimated that the average follows a Gauss law, even this characteristic is changed.

- **The inspection of the minimum content** consists of verifying that the content of each prepackage of the lot deviates the least possible of the average content of the lot.

The examples in Annex 2 could show the consequences of the choice of the method on the final decision about the checked lot.

- **About the sample of 20 units** for a lot of 10 000 units, there is no mathematical relationship between sample size (n) and lot size (N). Therefore, mathematically, there is no objection to taking a sample of small size to inspect a homogeneous lot of large size. The ratio n/N influences sampling error only when the lot size is small.

The double checking leads the manufacturer to have better control of its outputs, whereas a simple checking of the average does not lead him to make adjustments, and oblige him to fill upper the containers in order to comply with the rules. Manufacturers applying this method said that it helps them to make better adjustments of the outputs and to save raw materials.

It is important that Member countries examine the proposed draft including the examples very carefully when formulating their comments.

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