

THE AVERAGE QUANTITY  
SYSTEM

PROPOSED  
AMENDMENTS TO THE  
WEIGHTS AND  
MEASURES  
REGULATIONS 1999

---

May 2001

# THE AVERAGE QUANTITY SYSTEM

## PROPOSED AMENDMENTS TO THE WEIGHTS AND MEASURES REGULATIONS 1999

---

May 2001

ISBN 0-478-24219-0



33 Bowen Street, PO Box 1473  
Wellington, New Zealand  
Phone: 64 (4) 474-2750  
Fax: 64 (4) 473-9400  
Email: [mcainfo@mca.govt.nz](mailto:mcainfo@mca.govt.nz)

# CONTENTS

FOREWORD .....	2
INTRODUCTION .....	3
BACKGROUND .....	5
THE AMENDMENT ACT AND THE PROPOSED REGULATIONS .....	7
COMMENT .....	11
APPENDIX A .....	12
APPENDIX B .....	14

**OFFICIAL INFORMATION ACT 1982**

In providing your submission, please advise us if you have any objections to the release of your submission, and, if you do object, the parts of your submission that you would wish withheld, and the grounds for withholding. The Ministry will carefully review any representations that you make in this regard, in preparing and releasing any summary, and in considering any formal Official Information Act requests that might be received in the future.

**PRIVACY ACT 1993**

Any personal information that you supply to the Ministry in the course of making a submission will be used only by the Ministry in conjunction with consideration of matters covered by this discussion paper only.

When preparing a summary of public submissions on any document for public circulation, it is the Ministry's normal practice to set out the names of parties making submissions on that document. Your name will be included in any such summary unless you inform the Ministry that you do not wish your name to be included. In order to indicate your wishes, or to view personal information held about you in respect of the matters covered by this discussion paper, or to request correction of that information, please contact the Ministry of Consumer Affairs, ph (04) 474 2750.



## FOREWORD

I am pleased to introduce the Ministry's consultation paper on the proposed regulations for the implementation of the Average Quantity System. I am confident that the introduction of the Average Quantity System in New Zealand will bring benefits for consumers. They will have greater assurance that they are getting what they pay for in terms of the quantity of goods in a package. I also see it as a positive step forward in bringing New Zealand more into line with our overseas trading partners. This will benefit export trade, as well as promote the goal of international uniformity of measurement.

Before these regulations can be made I am required to consult with such individuals or organisations as I think fit and I now seek your comments on the contents of this paper and the proposed regulations it contains.

Please send any comment you may have by **Monday 2 July 2001** to:

Mary Waller  
Senior Advisor, Trade Measurement  
Ministry of Consumer Affairs  
PO Box 1473  
Wellington

Fax: 04 473 9400  
Email: [mary.waller@mca.govt.nz](mailto:mary.waller@mca.govt.nz)

Jim Anderton  
**Acting Minister of Consumer Affairs**



# INTRODUCTION

## Purpose of this paper

This paper sets out the Ministry's proposals for changes to the Weights and Measures Regulations 1999 that must come into force in November 2001. They will provide for the practical implementation of a new system for checking compliance with quantity requirements for packaged goods. This system is known as the Average Quantity System (AQS).

The purpose of this paper is to seek comments from interested parties on the proposed regulations. Before the Minister makes any recommendation for putting in place new regulations, he is required to consult with such individuals or organisations, as he thinks fit, to ensure these new rules are acceptable to business and consumers.

Your comments are sought on any part or all of the regulations, especially if any part would not be clear and comprehensible to those using them or if there is any aspect which you feel is inaccurate, likely to cause hindrance to trade, or confusion to consumers, or is inequitable.

In addition to this consultation exercise the Ministry is required by Cabinet to set up a panel, made up of representatives from business, to review the final draft of the regulations before they can be implemented. This is an extra precaution the Government has put in place to ensure effective regulation.

## What is AQS?

AQS is an internationally recognised system for determining deficiencies in packages sold by quantity. It can be used where goods are packed in set amounts, eg 1 kg bags of sugar or 1 litre of milk, and labelled as such. It is used in a number of other countries or economies including the European Union, Canada, the USA, South Africa and Japan. Australia is currently going through a consultation process and expects to adopt the system in the near future.

While modern (usually automated) filling and packing processes can reduce production costs, it has to be recognised that with such systems, filling every package to an exact amount, over a production run, is not achievable.

Our current system of checking the quantity of goods recognises this to some extent and already makes a small allowance or negative tolerance on pack quantities. Our current method of checking is not based on recognised sampling techniques.

AQS differs from our current system in that it uses statistical sampling methods and provides both business and consumers with a far greater assurance that the packaged goods they sell and buy contain the amount stated on the label.

Converting to this system will bring us into line with international trading partners and allow for easier export where quantity marking is an issue.



## Making new legislation

The Ministry of Consumer Affairs undertook full public consultation on the proposal for AQS by issuing a discussion document in 1996. The responses received indicated strong support for the introduction of the system. In 1998 the Government agreed to introduce AQS for the net contents of pre-packaged goods.

On 21 January 1999 the then Minister of Consumer Affairs wrote to party leaders and independent MPs and sought their agreement to include the AQS provisions in an amendment to the Weights and Measures Act 1987 (the Act) by way of the Statutes Amendment Bill. The amendment was enacted in November 2000.

The Weights and Measures Act is the primary piece of legislation relating to weights and measures or trade measurement in New Zealand. An act sets out the main principles of law (for example it may spell out what offences exist in connection with a certain activity), but sometimes these need to be supported by more detailed provisions. Making regulations usually does this and this is known as secondary legislation.

The main amendment to the Act is a new offence in relation to short quantity pre-packaged goods. The Act also allows the Minister of Consumer Affairs to recommend to the Governor-General that technical regulations be made to implement AQS. It is these regulations that are proposed and discussed in this paper.

## What the regulations will do

The regulations the Ministry is proposing would provide a framework for Trading Standards Officers (also known as Inspectors of Weights and Measures) to carry out quantity tests on packaged goods. They would give the technical and statistical detail required to ensure tests are carried out fairly and uniformly.

The regulations would also detail the “rules” that industry will need to follow to ensure they comply with the law. These rules are discussed in greater detail later in the paper. The proposed regulations are not onerous. They do not prescribe a series of duties for packers, importers and sellers or say how business should go about complying with the rules. Many packers will already have in place checking systems to ensure their package quantities are accurate and the Ministry does not wish to impose upon business a particular type of checking system.



# BACKGROUND

## Trade in packaged goods

Trade in packaged goods has changed greatly over the past 30 years. Goods are more easily imported into both New Zealand and Australia. The markets of both countries are worldwide. Both countries have commitments to:

- the World Trade Organisation (WTO)
- each other through Trans-Tasman Mutual Recognition Arrangement (TTMRA)
- Asia Pacific Economic Co-operation (APEC) and
- the Australia/New Zealand (CER) - ASEAN Free Trade Area (AFTA) Memorandum of Understanding on Standards and Conformance.

Given these substantial changes in our trading arrangements there is a need to harmonise international standards in an effort to reduce technical barriers to trade. In the area of determining the quantity of packaged goods there is an international standard which is known as the Average Quantity System (AQS).

## Setting a standard

The AQS standard is set out in a document from the International Organisation of Legal Metrology (OIML) entitled “OIML R87 Net Quantity in Prepackages”. This was first issued in 1989. It is currently being updated and a second draft has been released for consultation. It is based on what is known in statistical terms as the “normal distribution”.

## The current system

The method of determining a deficiency in packaged goods is at present administered by what could be termed a “minimum quantity system”. In general, a package marked with a statement of quantity must contain at least that quantity. This applies throughout the distribution process, from the time the goods are packed to the time the goods are sold.

At face value, a “minimum” system might sound like the ideal for consumers, however, it does not recognise that with modern packing processes variations in “fill” level do inevitably occur. Current legislation in New Zealand does recognise that variations occur when establishing fill levels of packaged goods. It does this by allowing deficiencies of no more than five percent in any one package, provided that the contents of that package plus 11 other of the same kind and stated quantity show no aggregate deficiency.

This means that any number of packages in a selection of 12 packages could be deficient by not more than five percent provided the overweight packages compensate for the deficient ones. For example if 12 x 1 kg packages are selected and if six are deficient by 50 grams each and six are overweight by 50 grams each, it can be argued that no offence has occurred. In the AQS this will not happen because, in the example stated, rules 2 and 3, would be breached.



## The new system – AQS

AQS will go further in providing assurance that packaged goods do contain the amount stated on the label, but will do so “on average”. The statistical sampling methods to be used, which are based on international standards, mean that it will be possible to give an assurance that 97.5 percent of the time a package will contain at least the amount stated on the label. With the current method of checking packages no such assurance can be given.

In addition, the tolerance limits that are prescribed under AQS are more practical. The standard allows for tolerances to be proportional to the product size and appropriate to the degree of difficulty in obtaining correct fill. In the proposed regulations, tolerances for small packages, eg below 100 g/ml will be greater than are provided for under the present legislation, but tolerances for packs greater than 100 g/ml will get progressively stricter.

Clearly, limiting the number of deficient packages in any production run has major gains for consumers. It also has major benefits for packers in that they will know precisely the acceptable limits, both in quantity and number, on each package for any production run. AQS is a standard which is fair to both consumers and packers.



# THE AMENDMENT ACT AND THE PROPOSED REGULATIONS

## Introduction

Amendments to the Weights and Measures Act 1987 have already been made to allow for the introduction of AQS. What the regulations proposed in this paper will do is give support to those amendments and provide technical details for Trading Standards Officers, as well as packers, importers, and sellers of packaged goods.

It is important to note that the Act and the proposed regulations relate to both food and non-food packaged goods which are packed to a set quantity and bear a statement of quantity.

## The Weights and Measures Amendment Act 2000

The amendments to the Weights and Measures Act 1987 are contained within the Weights and Measures Amendment Act 2000. Section 16 concerns short weight offence provisions and section 41 provides for the making of new regulations. Appendix A contains an explanation of the amendments. Copies of the Weights and Measures Amendment Act 2000 are available through bookshops (ref 2000 No 86) or via the "Knowledge Basket" website. These amendments came into force on 14 November 2000.

The amendments provide for certain new definitions that are crucial to the implementation of AQS. These are set out in Appendix A. In the following section we have tried to provide a layperson's definition of terms contained in the Amendment Act, which are also used in the proposed regulations.

## The proposed regulations

The proposed regulations are set out in the general format they could finally take in Appendix B. This section provides explanations of each regulation. Once comment has been received on these proposals, final drafting can take place. The regulations will take effect on 14 November 2001.

## Tests by Trading Standards Officers

AQS takes the emphasis for quantity control from the point of retail sale to the place of packing, the rationale being that it is better not to produce short weight, measure or number packages, than to deal with such items when they are already in the retail chain. However, it is envisaged that some tests by Trading Standards Officers (TSOs) will be carried out at retail level, particularly where goods are packed on the premises.



This means that while retailers would still be liable for selling short quantity packaged goods under section 16 and 16A, TSOs would concentrate their efforts on the business that packs the goods or brings them into New Zealand. This is in line with international practice and seeks to identify problems earlier, before they present in the market place.

## Checks for packers, importers and sellers

The intention of the Act and the proposed regulations is not that packers, importers or sellers will have to carry out the same tests that TSOs would make. They may however, wish to take advantage of the benefits of such a system. Many packers currently operate quality management systems that will provide adequate checks and assurance that they will fulfil the new rules. Packers, importers or retailers may use the regulations as a guide or refer to other publications or sources of statistical information.

The extent and frequency of checks packers will need to make will vary depending on the quantities they pack, the type of packing and their capability. The type of sampling plan or checking system used is entirely up to the packer. As packers gain experience with checking they will be able to more accurately determine the frequency with which they need to carry out checks. The same applies to importers and sellers.

Having a checking system and keeping records of checks will make it easier to provide an adequate defence if packers, importers or sellers are accused of breaching the Act. They also need to show they are properly following that system to be able to demonstrate that they are taking “reasonable precautions” *and* exercising “due diligence”.

## Statistics

The tables used in the proposed regulations are mainly based on OIML document R87. Certain details have been taken directly from R87, which will ensure packages exported to or from the European Union for example, have the same tolerances applied. However, the Ministry has sought expert advice from the Applied Mathematics Centre of Industrial Research Ltd, in relation to the inspection lots and sampling characteristics shown in Table 1. The figures used in the proposed regulations are statistically valid and we believe based on sound mathematics. The proposed regulations intend to allow flexibility in the manner of compliance, whilst retaining the elements that will allow New Zealand exporters to compete on equal terms with many overseas producers.

## Explanation of terms

“*Non standard package*” means a package of goods that contains less than the quantity stated on the package and where the deficiency is greater than a set tolerance, but not greater than twice that set tolerance.



“*Inadequate package*” means a package that contains less than the quantity stated on the package and where the deficiency is more than twice the amount of set tolerance.

These tolerances are set out in Table 2 of the proposed regulations and the deficiency allowed depends on the size (mass, volume, number etc) of the package being tested. An illustrative example is given in the explanation for “Regulation 94 – Determining a non standard or inadequate package”.

“*Lot of packages*” means a group of packages from the same production run which are of the same kind, the same stated weight, measure, or number and are available for inspection by a TSO at the same time and place. This could be a group taken over a set time from a packing line, or direct from warehouse stock.

## Regulation 92 - Examination by sample

In order for TSOs to determine if any package in a lot of packages is deficient, they must take a sample from that lot and test the packages in the sample for quantity. Regulation 92 gives TSOs the correct sample size to select. Packers, importers and sellers could also use this if they wish to set up a checking system.

Table 1, shown in Appendix B, provides for sample sizes dependent on lot size. Column 3, in that table, provides a figure to be used in the calculation for “weighted average” quantity. The “weighted average” takes into account statistical “acceptance criteria” and allows for the randomness of the sampling.

In a similar way Column 4, which gives the TSO the number of non standard packages permitted in the *sample*, is tabulated to incorporate a statistical adjustment which takes into account the randomness of sampling. That is why this column appears to provide a different figure from that which might be expected by the general rule, described below, that states not more than two and a half percent of non standards are allowed in a *lot*.

## Regulation 93 - Determining a deficiency

This is an important regulation for packers, importers and sellers. It reflects the three rules of AQS with which a lot of packages must comply. If a sample taken from a lot fails any one of the requirements of this regulation, the sample fails and the lot fails. The three rules are that:

- (1) the sample must pass the test for average quantity,
- (2) there must not be more than two and a half percent non standard packages in the lot and
- (3) there must be no inadequate packages.

When a lot fails, the whole lot will have to be rejected – this may mean the lot has to be reweighed, repacked and labelled or whatever it takes to ensure that the lot will pass the rules.



## Regulation 94 - Determining a non standard or inadequate package

This regulation concerns the actual tolerances that determine whether a package is deficient ie non standard or inadequate. The tolerances shown in Table 2 depend upon the stated quantity (mass/volume) of the goods in the package. Table 3 shows tolerable deficiencies for area, length and width and number of items. This enables anyone checking a sample of packages to determine the two lower limits for package quantities and hence if an offence is likely to be committed.

This can be demonstrated by Example 1. The formulas used in this example are defined in proposed Regulation 95 in Appendix B.

From a production run of one-kilogram packages of sugar there is a lot size 148. Using Table 1 a sample size 12 is therefore selected and from Table 2, it can be seen that the tolerable deficiency ( $T$ ) set is 15 g. The first lower limit ( $T$  1) is therefore 985 g and the second lower limit ( $T$  2), 970 g.

### Example 1

<b>Package weights above 1 kg are acceptable</b>		
<b>1 kg</b>	-----	
	Package weights falling within this band are acceptable <b>providing the sample passes the “average test”</b>	
<b>T1 985 g</b>	-----	
	Package weights falling within this band are <b>“non standard”</b> No more than 2.5% allowed in the lot	
<b>T2 970 g</b>	-----	
	Package weights falling below here are <b>“inadequate”</b> No packages may be below this limit	

Taking a sample size 12 we might find a typical distribution of package weights of sugar like this:

1014 g	1006 g	998 g
1011 g	1005 g	997 g
1010 g	1002 g	997 g
1006 g	1001 g	995 g

The average of the sample is calculated by adding the weights of all the packages and dividing by the number of packages.

So,  $\bar{x} = 1003.5$  g

Then, using the formula shown in the table in Regulation 95 to calculate the “weighted average”,  $\bar{x}_a = \bar{x} + s(t \div \sqrt{n})$ , where  $s = 6.17$

$\bar{x}_a = 1008.8$  g

This means the sample passes the average test, the test for non standards (none are non standard; the maximum number permitted in the sample according to Column 4 of Table 1, is two) and the test for inadequates (none are below 970 g).



## Regulation 95

This regulation simply gives the formula to be used to determine the weighted average and explains what each term or symbol means.

## Schedule 9

The proposed Schedule 9 provides the tables of statistical details be used by TSOs when carrying out tests on packages.

## Schedule 5

The amendments shown for proposed Schedule 5 are required following the change from Ministry of Commerce to Ministry of Economic Development.

## COMMENT

The intention of the proposed regulations is to provide straightforward rules that can be followed by the enforcement agency, consumers and especially business. They should create the framework to allow a new system to flourish without prescribing methods of compliance. They should not leave any loopholes that could lead to confusion for packers, importers or retailers. If having read this document you have comments or queries please let the Ministry know.



# APPENDIX A

## The Weights and Measures Amendment Act 2000

The Amendment Act provides for certain new definitions that are crucial to the implementation of AQS:

“Non standard package” means a package enclosing goods that contains less than the quantity stated on the package or a label attached to it, where the deficiency is more than the amount of error specified for the purpose in regulations made under section 41A but not more than twice that specified amount of error

“Inadequate package” means a package enclosing goods that contains less than the quantity stated on the package or a label attached to it, where the deficiency is more than twice the amount of error specified for the purpose in regulations made under section 41A.

“Lot of packages” means a collection of packages enclosing goods that –

- are of the same kind,
- are of the same stated weight, measure, or number and
- are available for inspection at the same time and place.

This definition becomes important in the sampling aspect of AQS.

“Desiccating goods” means any goods made up in a package that lose weight or volume solely through evaporation after the package is made up.

An example of a desiccating good is soap powder.

## Offence section

Section 16 (1) of the 1987 Act becomes the new section 16 but it is split into two subsections to differentiate between “selling” and “purporting to sell”.

A new section 16A is included and it is this section which provides for the offences relating to AQS. Section 16A provides for a basic offence of selling short quantity (measure, weight or number) packaged goods where the quantity is stated on the package or label. It then goes on to allow for “average quantity” provisions. It does this by saying that a package is deemed to be the quantity stated on the package or label providing the package meets certain requirements which will be set out in the proposed regulations.

Section 16A makes allowances for desiccating goods in subsection 4. This subsection says that a package must be correct on the day it was made up and remain so for up to seven days starting from the day after the packing day. For the package to be correct it just has to meet the same requirements for average quantity referred to earlier and set out in the regulations. After the seven-day period the only rule which still applies is that a package must not be found to be “an inadequate package”.



A breach of section 16 or section 16A may result in an Infringement Offence Notice for \$500 being issued or a prosecution with a fine not exceeding \$5000.

The ability of the Court to order an offender to make good, either in goods or money, the deficiency between the quantity of goods sold or delivered and the amount charged for, is retained and extended to include AQS goods.

## Recommending regulations

Finally a new section has been added which allows the Minister of Consumer Affairs to recommend regulations concerning the technical aspects of AQS such as setting tolerances, sample sizes, methods of selecting samples etc. Before making such a recommendation the Minister must consult with such interested parties as the Minister thinks fit.



# APPENDIX B

## Weights and Measures Regulations 1999 – proposed amendments

### PART 8

#### AVERAGE QUANTITY SYSTEM

**92. Examination by sample** – (1) In determining whether, in a lot of packages, any package enclosing goods where the quantity of the goods is stated on the package or label attached thereto, is deemed to be deficient under Section 16A of the Act, an inspector shall take from that lot of packages, which contains a number of packages as set out in Column 1 of Table 1 to the Ninth Schedule of these regulations, a sample number of packages as set out in Column 2 of that table.

**93. Determining a deficiency** – (1) In these regulations the term ‘weighted average’ refers to a statistical adjustment to the average quantity of the goods in a sample taking account of the randomness of the sample

(2) A package enclosing goods where the quantity of the goods is stated on the package or on a label attached thereto shall be deemed to be deficient under Section 16A of the Act if the package is one in a lot of packages –

- (a) where the weighted average quantity of any sample taken from that lot of packages, as determined in the manner set out in Table 1 of the Ninth Schedule to these regulations, is less than the stated quantity on that package or label attached thereto and/or :-
- (b) where the number of non standard packages in any sample taken from that lot of packages is more than the number set out in Column 4 of Table 1 of the Ninth Schedule to these regulations as applied to the sample size set out in Column 2 of Table 1 and/or :-
- (c) which contain in any sample taken from that lot of packages any inadequate packages.

**94. Determining a non standard or inadequate package** – (1) For the purposes of determining whether a package, is a non standard or inadequate package under Section 2 of the Act, the errors applicable shall be those set out in Column 2 of Table 2, and Column 2 of Table 3 of the Ninth Schedule to these regulations and referred to as the tolerable deficiency (*T*).



**95. Formula for determining the weighted average quantity of the packages in a sample** - (1) For the purposes of Regulation 94 the formula for determining the weighted average quantity of the packages in a sample is as follows:

$$\bar{x}_a = \bar{x} + s(t \div \sqrt{n})$$

Where :	
$\bar{x}_a$	is the weighted average quantity of the units in the sample
$\bar{x}$	is the sample mean calculated as follows: $\bar{x} = \sum x \div n$
$\sum x$	is the sum of the net quantities of all the units in the sample
$t$	is 0.995 of students t-distribution with $n-1$ degrees of freedom
$t \div \sqrt{n}$	is the sample correction value shown in column 3 of Table 1
$s$	is the standard deviation of the sample, calculated as follows $\sqrt{\frac{\sum x^2 - n(\bar{x}^2)}{n-1}}$

## Proposed Schedule 9

*Table 1 Inspection Lots and Sampling Characteristics*

Column 1 Inspection lot size	Column 2 Sample size	Column 3 Sample correction factor $(t \div \sqrt{n})$	Column 4 Number of non standard packages permitted in a sample
1	1	0	0
2	2	0	0
3	3	0	0
4	4	0	0
5	5	0	0
6	6	0	0
7	7	0	0
8	8	0	0
9	9	0	0
10	10	0	0
11	11	0	0
12	12	0	0
13 to 40	12	0.750	0
41 to 79	12	0.826	1
80 to 149	12	0.860	2
150 to 399	32	0.465	3
400 to 4000	32	0.483	4
More than 4000	80	0.295	6

*Table 2 Tolerable Deficiencies for Packages Labelled by Mass or Volume*

Column 1 Stated quantity ( $Q$ ) g or ml or cc	Column 2 Tolerable deficiency ( $T$ ) Percent of $Q$	Column 2 Tolerable deficiency ( $T$ ) g or ml or cc
0 to 50	9	-
50 to 100	-	4.5
100 to 200	4.5	-
200 to 300	-	9
300 to 500	3	-
500 to 1000	-	15
1000 to 10 000	1.5	-
10 000 to 15 000	-	150
15 000 to 25 000	1	-
Over 25 000	2	-



*Table 3 Tolerable Deficiencies for Packages Labelled by Reference to Quantities Other than Mass or Volume*

Column 1 Quantity type	Column 2 Tolerable deficiency ( <i>T</i> )
Length or width	2% for all packages
Area	3% for all packages
Number	2% rounded up to nearest whole number for all packages containing more than 50 items 1 item for packages containing less than 50 items

## Proposed Schedule 5

### **Form 10 (Infringement Offence Notice form - \$500)**

Remove references to the Ministry of Commerce and Secretary of Commerce and substitute Ministry of Economic Development and Chief Executive of the Ministry of Economic Development.

Remove paragraph 4 of the Summary of rights and substitute new defences provided in section 16A (4) and (5) of the new Act.

### **Form 11 (Infringement Offence Notice form - \$200)**

Remove references to the Ministry of Commerce and the Secretary of Commerce and substitute Ministry of Economic Development and Chief Executive of the Ministry of Economic Development.