Canadian General Standards Board

Office des normes générales du Canada

CGSB

ONGC

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WITHDRAWAL

March 2003

CANADIAN GENERAL STANDARDS BOARD

MINIMUM NUTRITIONAL TESTING, LABELLING AND MANUFACTURING PROCEDURES FOR PET FOODS

This CGSB standard is hereby withdrawn because, as far as can be determined, it is no longer being used.

RETRAIT

Mars 2003

OFFICE DES NORMES GÉNÉRALES DU CANADA

EXIGENCES NUTRITIONNELLES MINIMALES RELATIVES AUX MÉTHODES D'ESSAI, D'ÉTIQUETAGE ET DE FABRICATION DES ALIMENTS POUR ANIMAUX FAMILIERS

Cette norme de l'ONGC est retirée par le présent avis parce que, dans la mesure où il est possible de le constater, elle n'est plus utilisée.

Canada

NATIONAL STANDARD OF CANADA

NORME NATIONALE DU CANADA

CAN2-146.1-M 83

Minimum Nutritional Testing, Labelling and Manufacturing Procedures for Pet Foods

Withdrawn/Retirée

Canadian General Standards Board
Office des normes générales du Canada

CGSB

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CAN2-146.1-M83

NATIONAL
STANDARD
OF CANADA

NORME
NATIONALE
DU CANADA

MINIMUM NUTRITIONAL TESTING, LABELLING AND MANUFACTURING PROCEDURES FOR PET FOODS

Withdrawn/Retirée

Prepared by/Préparée par

Canadian General Standards Board
l'Office des normes générales du Canada CGSB

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Acknowledgement is made for the French translation of this National Standard of Canada by the Translation Bureau of the Department of the Secretary of State and the technical editing of the translation by the Supply Information and Data Management Branch of the Department of Supply and Services.

CAN2-146.1-M83

CANADIAN GENERAL STANDARDS BOARD

Standard for

MINIMUM NUTRITIONAL TESTING, LABELLING AND MANUFACTURING PROCEDURES FOR PET FOODS

1. INTRODUCTION

1.1 SCOPE

This standard applies to the nutrient content and adequacy of pet food for dogs and cats, including relevant test procedures to maintain quality control.

The standard permits two methods of evaluation: complete feeding studies, and limited feeding studies with chemical analysis.

1.2 NUTRITIONAL REPRESENTATION

A label of a pet food may carry a nutritional claim that the product:

a. is adequate for gestation and lactation

b. is adequate for growth of pets

c. will maintain a pet's health

d. is complete and balanced for a pet's life

if, and only if, such claim or claims have been proven by using those portions of the nutritional test procedures established by CGSB in this standard relevant to the claim being made.

There are two methods for proving nutritional claims: Method 1 includes complete animal feeding studies, and Method 2 includes limited animal feeding studies. Products that have proved nutritional claims by Method 2 must prove those claims by Method 1 within five years from the start of a certification listing program.

2. APPLICABLE PUBLICATIONS

2.1 The following publications are applicable to this standard:

2.1.1 National Research Council, National Academy of Sciences (NRC/NAS) (USA)

Nutritional Requirements of Domestic Animals No. 8, Nutrient Requirements of Dogs

Nutritional Requirements of Domestic Animals No. 13, Nutrient Requirements of Cats

2.1.2 Canadian Council on Animal Care

Guide to the Care and Use of Experimental Animals.

2.1.3 Canadian General Standards Board (CGSB)

CGSB 101 - Manufacturer's Inspection System Requirements for Qualification/Certification Listing Programs

CGSB 103 - Manufacturer's Certification Listing Programs; Policies and Procedures.

2.2 Reference to the above publications is to the latest issue, unless otherwise specified by the authority applying this standard. Sources for these publications are shown in the Notes section.

3. METHOD 1 (COMPLETE ANIMAL FEEDING STUDIES)

3.1 **Dogs** - Product must be fed successfully to animals as per protocols in this standard.

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3.1.1 Minimum Testing Procedures for Proving an Unqualified Claim of Nutritional Adequacy of a Dog Food

The minimum testing necessary to prove nutritional adequacy is obtained by using the gestation/lactation and the growth test procedures. These procedures must be used sequentially. Thus, a manufacturer who wants to prove an unqualified claim for nutritional adequacy must use the litters obtained from the bitches used in the gestation/lactation test procedures when the growth test procedure is carried out.

3.1.2 Minimum Testing Procedure for Proving a Gestation/Lactation Claim for a Dog Food

To establish a basis for comparison and to accurately measure the test results, use either a control diet or, when adequate data is available, previous performance curves. A control diet is one that meets the nutritional requirements for dogs as published by NRC/NAS or any other authority on dog nutrition recognized by the CGSB Committee on Nutritional Test Procedures for Pet Foods, and which has been shown by test feeding to be adequate for gestation/lactation of dogs.

3.1.2.1 Dogs - Use enough bitches at the start to ensure a minimum of six pregnant bitches for the test. Use pure-bred stock and ensure that the stud and bitch are of same breed. Select the dogs from breeds of which the mature male attains the average mass of not less than 7 kg. Registration of the dogs is not required. Select bitches in the second or later heat period. Bitches shall be less than eight years of age. If a control diet is used, use bitches that are of similar age and breeding on both rations.

3.1.2.2 Duration of Test - Commence the feeding of the test diet at the first sign of heat. Complete the test when the pups are weaned (at least six weeks of age).

3.1.2.3 Feeding - Feed each bitch as an individual and feed each bitch and her litter as an individual unit, according to the proposed directions. Use the diet being tested as the sole source of nourishment, except for water, and feed the same formulation throughout the test. Offer fresh water ad lib. If a control diet is used, feed it under the same conditions as the test diet. Explain and record any interruptions in the feeding procedures. Maintain records and report all illnesses and medication used during the test procedure. Record the reason for death of any animal during the trial.

3.1.2.4 Parameters Measured - Measure the total food intake and record individually for each bitch during pregnancy and as an individual unit for each bitch and her pups during lactation. Measure and record the individual body mass of bitches during pregnancy and of bitches and pups during lactation initially, weekly and at the end of the test. Record the litter size, the sex of pups and reproduction abnormalities (stillborn, congenital anomalies, etc.) and the age of weaning.

3.1.2.5 Clinical Observations - Give a complete physical examination as described in par. 7.1 for each bitch at breeding, during the first week of lactation, and weaning. Examine all pups at birth and give all pups a complete physical examination at weaning. The examination and evaluation is the responsibility of a licensed veterinarian.

3.1.2.6 Interpretation - Two-thirds of the pregnant bitches (to a minimum of four) started on the test shall meet the following requirements:

a. Individual bitches shall gain mass during gestation. One week after whelping, the body mass should be the original test mass. The maximum loss permitted is 10%. At weaning, the original test mass of each bitch is desired, and the maximum loss permitted is 15%.

b. Each bitch shall wean at least 75% of her one-day old pups, but in no case shall a litter of the large breeds (20 kg and over for the average mass of mature males) have less than four pups or a litter of the smaller breeds (less than 20 kg for average mass of mature males) have less than three pups.

c. The average mass of the pups shall, as a minimum, equal the growth curve of pups in normal ranges for the breed. Normal growth curves are determined from either:

(i) credible performance data for a particular breed, or

(ii) a control group fed a diet described above.

d. Any bitch or pup showing any abnormalities (as per physical examination, par. 7.1) due to diet is an evaluation failure.

e. No dog shall show nutritional health problems.

3.1.3 Minimum Testing Procedure for Proving a Growth Claim for a Dog Food

To establish a basis for comparison and to accurately measure the test results use either a control diet or, when adequate data is available, previous performance curves. A control diet is one that meets the nutritional requirements for dogs as published by NRC/NAS or any other authority on dog nutrition

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recognized by the CGSB Committee on Nutritional Test Procedures for Pet Foods and one that has been shown by test feeding to be adequate for growth of dogs.

3.1.3.1 Dogs - Use a minimum of six dogs for each test diet. Select the dogs from at least three litters. The dogs must be of the same breed and shall be of pure bred stock, but do not have to be registered. Use dogs that are at least six weeks of age and weaned. The dogs shall be selected from breeds of which the mature male attains an average mass of not less than 7 kg. Equal sex and mass distribution is preferred but not mandatory for the dogs used in the test.

If a control diet is used the litters shall be divided as equally as possible between the diets to meet the minimum number of dogs required.

3.1.3.2 Duration of Test - Start the test when the dogs are not more than eight weeks old and are weaned, and then run the test for a period of at least ten weeks.

3.1.3.3 Feeding - Feed the dogs according to the proposed direction. Use the diet being tested as the sole source of nourishment, except for water, and feed the same formulation throughout the test. Offer fresh water ad lib. If a control diet is used, feed it under the same conditions as the test diet. Explain and record all interruptions in feeding procedures. Maintain records and report all illnesses and medication used during the test procedure. Record the reason for the death of any animal during the trial.

3.1.3.4 Parameters Measured - Measure and record weekly individual body mass, body length or ulna length.

3.1.3.5 Clinical Observations - Give each pup a complete physical examination as described in par. 7.1 at the beginning and at the end of the trial. The examination and evaluation is the responsibility of a licensed veterinarian.

3.1.3.6 Interpretation

a. The average mass of the dogs shall, as a minimum, fall within the normal ranges of the growth curve of pups for the breed used. Normal growth curves are determined from either:

(i) credible performance data for a particular breed, or

(ii) a control group fed a diet as described above.

b. No dog shall show nutritional health problems.

3.1.4 Minimum Testing Procedures for Proving Only a Maintenance Claim for a Dog Food

As the dog is its own control in proving a maintenance claim, no control diet is required.

3.1.4.1 Dogs - A minimum of six dogs, individually fed, shall be used for the test. No specific breed is required. The dogs should be at least twelve months but not over eight years of age. There is no specific requirement as to size. There is no specific sex requirement, but females in gestation and/or lactation shall be excluded. Do not use neutered dogs.

3.1.4.2 Duration of Test - The test shall be run for a minimum of twenty-six weeks.

3.1.4.3 Feeding - Feed each dog according to the proposed directions. Use the diet being tested for the sole source of nourishment, except for water, and feed the same formulation throughout the test. Offer fresh water ad lib. Explain and record any interruptions in feeding procedures. Maintain records and report all illnesses and medication used during the test procedures. Record the reason for the death of any animal during the trial.

3.1.4.4 Parameters Measured - At the beginning and at the end of the feeding trials,weigh each animal and combine and average their body masses. Determine, calculate and record average daily food consumption for each individual.

3.1.4.5 Clinical Observations - Give each dog a complete physical examination as described in par. 7.1 at the beginning and end of the trial. The examination and evaluation is the responsibility of a licensed veterinarian.

3.1.4.6 Interpretation

a. The test diet is deemed to have failed this protocol if any dog exhibits an excessive mass change during the trial. Mass change is considered excessive if:

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(i) any one dog has gained or lost more than 15% of its initial mass; or

(ii) the average mass of the group has increased or decreased more than 10% of the original combined average mass.

b. No dog shall show nutritional health problems.

3.2 **Cats** - Product must be fed successfully to animals as per the protocols in this standard.

3.2.1 Minimum Testing Procedure for Proving an Unqualified Claim of Nutritional Adequacy for Cat Food

The minimum testing necessary to prove nutritional adequacy may be obtained by using the gestation/lactation and the growth test procedures. These procedures must be used sequentially. Thus, a manufacturer desiring to prove an unqualified claim for nutritional adequacy must use the litters obtained from the queens used in the gestation/lactation procedures when the growth test procedures are carried out.

3.2.2 Minimum Testing Procedure for Proving a Gestation/Lactation Claim for a Cat Food

To establish a basis for comparison and to accurately measure the test results, either feed a control diet or, when adequate data is available, use previous performance curves. A control diet is one that meets nutritional requirements for cats published by NRC/NAS or any other authority on cat nutrition recognized by the CGSB Committee on Nutritional Test Procedures for Pet Foods and that has been shown by test feeding to be adequate for the gestation/lactation of cats.

3.2.2.1 Cats - Use a minimum of eight pregnant queens for each diet being tested. It is suggested that enough cats be used at the start to ensure at least eight pregnant queens for each diet. The queens should be at least one year old. If a control diet is used, use queens on both rations that are of similar age and breeding.

3.2.2.2 Duration of Test - Commence the feeding of the test material by the time each queen has mated. Complete the test when the kittens are six weeks of age.

3.2.2.3 Feeding - Feed each queen as an individual and feed each queen and her litter as an individual unit, according to the proposed directions. Use the diet, being tested as the sole source of nourishment, except for water, and feed the same formulation throughout the test. The test diet may be any number of flavors of the family product under test. Offer fresh water ad lib. If a control diet is used it shall be fed under the same conditions as the test diet. Explain and record all interruptions in the feeding procedure. Maintain records and report all illnesses and medication used during the test procedure. Record the reason for the death of any animal during the trial.

3.2.2.4 Parameters Measured - Measure and record individually the total food intake and record individually for each queen during pregnancy and for each queen and her kittens during lactation. Measure and record the individual body mass of queens during gestation and of kittens during lactation initially, weekly, and at the end of the test. Record the litter size, the sex of the kittens, reproductive abnormalities (stillborn, congenital anomalies, etc.) and the age of weaning.

3.2.2.5 Clinical Observations - Give a complete physical examination as described in par. 7.1 for each queen at breeding, within one week of queening and at weaning. Examine all kittens at birth and give all kittens a complete physical examination at weaning. The examination and evaluation is the responsibility of a licensed veterinarian.

3.2.2.6 Interpretation - At the end of the test the eight pregnant queens started on the test shall meet the following requirements.

a. Individual queens shall show a mass gain during gestation. The average body mass of all queens on the diet shall be equal to or more than the average body mass of the control group or reference data.

b. Each queen shall raise at least 60% of her one-day old kittens and, as a minimum, raise the number of kittens equal to the control group or reference data.

c. The average mass of the kittens, shall be at least in accordance with the growth curve of kittens in normal ranges. Normal growth ranges are determined by use of either:

(i) credible performance data of the particular type of cat, or

(ii) a control group fed a diet as described above.

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Kittens lost during lactation may be omitted when calculating the average mass.

d. Any queen or kitten showing any abnormalities (as per par. 7.1) due to diet is an evaluation failure.

e. No cat shall show nutritional health problems.

3.2.3 Minimum Testing Procedure for Proving a Growth Claim for Cat Food

To establish a basis for comparison and to accurately measure the test results, use either a control diet or, when adequate data is available, previous performance curves. A control diet is one that meets nutritional requirements for cats published by NRC/NAS or any other authority on cat nutrition recognized by the CGSB Committee on Nutritional Test Procedures for Pet Foods and one that has been shown by test feeding to be adequate for the growth of cats.

3.2.3.1 Cats - Use a minimum of eight weaned kittens for each test diet. Select the kittens from at least three litters. Equal sex and mass distribution is preferred, but not mandatory, for the kittens used in the test. If a control diet is used the litters shall be divided as equally as possible between the diets to meet the minimum number of kittens required.

3.2.3.2 Duration of Test - Start the test when the kittens are a maximum of ten weeks old and run the test for at least eight consecutive weeks.

3.2.3.3 Feeding - Feed the kittens according to proposed directions. Use the diet being tested as the sole source of nourishment, except for water, and feed the same formulation throughout the test. The test diet may be any number of flavors of the family of product under test. Offer fresh water ad lib. If a control diet is used feed it under the same conditions as the test diet. Explain and record all interruptions in feeding procedures. Maintain records and report all illnesses and medications used during the test procedure. Record the reason for the death of any animal during the trial.

3.2.3.4 Parameters Measured - Measure and record weekly the individual body mass, body length or ulna length.

3.2.3.5 Clinical Observations - Give each kitten a complete physical examination, as described in par. 7.1, at the beginning and at the end of the trial. The examination and evaluation is the responsibility of a licensed veterinarian.

3.2.3.6 Interpretation

a. The average mass of the cats shall, as a minimum, fall within the normal range of the growth curves (for kittens) as determined from either:

(i) credible performance data for a particular type of cat, or

(ii) a control group for a diet as described above.

b. No cat shall show nutritional health problems.

3.2.4 Minimum Testing Procedure for Proving Only a Maintenance Claim for a Cat Food

As the cat is its own control in proving a maintenance claim, no control diet is required.

3.2.4.1 Cats - A minimum of eight cats shall be used for each test diet. The animals shall be at least twelve months and not over six years of age. There is no specific sex requirement, but females in gestation/lactation shall be excluded. Do not use neutered cats.

3.2.4.2 Duration of Test - The test shall be run for a minimum of twenty-six weeks.

3.2.4.3 Feeding - Feed each cat according to the proposed directions. Use the diet being tested as the sole source of nourishment, except for water, and feed the same formulation throughout the test. The test diet may be any number of flavors of the family of product under test. Offer fresh water ad lib. Explain and record any interruptions in feeding procedure. Maintain records and report all illnesses and medications used during the test procedure. Record the reason for the death of any animal during the trial.

3.2.4.4 Parameters Measured - At the beginning and end of the feeding trial, weigh each animal and combine and average their body masses. Determine, calculate and record average daily food consumption for each individual.

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3.2.4.5 Clinical Observations - Give each cat a complete physical examination as described in par. 7.1, at the beginning and at the end of the trial. The examination and evaluation is the responsibility of a licensed veterinarian.

3.2.4.6 Interpretation

a. The test diet is deemed to have failed this protocol if any cat exhibits an excessive mass change during the trial. Mass change is excessive if:

(i) any one cat has gained or lost more than of 15% of its initial mass, or;

(ii) the average mass of the group has increased or decreased in excess of 10% of the original combined average mass.

b. No cat shall show nutritional health problems.

4. METHOD 2 (LIMITED ANIMAL FEEDING STUDIES)

4.1 **Dogs** - The product must meet the chemical analysis requirements of NRC/NAS and must be fed successfully to animals as per protocols in this standard.

4.1.1 Chemical Analysis - Must show compliance with the complete NRC/NAS analysis as described by the Committee on Animal Nutrition of the National Research Council (U.S.) (Refer to Table 1, Nutrient Requirements of Dogs, No 8.)

4.1.2 Limited Animal Feeding Studies for Dogs - To establish a basis for comparison and to accurately measure the test results use either a control diet or, when adequate data is available, previous performance curves. A control diet is one that meets the nutritional requirements for dogs as published by NRC/NAS or other authority on dog nutrition recognized by the CGSB Committee on Nutritional Test Procedures for Pet Foods and that has been shown by test feeding to be adequate for growth of dogs.

4.1.2.1 Dogs - Use a minimum of six dogs for each test diet. Select the dogs from at least three litters. The dogs must be of the same breed and shall be of pure-bred stock, but do not have to be registered. Use dogs that are at least six weeks of age and weaned. The dogs shall be selected from breeds of which the mature male attains an average mass of not less than 7 kg. Equal sex and mass distribution is preferred but not mandatory for the dogs used in the test. If a control diet is used the litters will be divided as equally as possible between the diets to meet the minimum number of dogs required.

4.1.2.2 Duration of Test - Start the test when the dogs are a maximum of eight weeks old and weaned. Run the test for the shortest of the following:

a. ten weeks;

b. until the average body mass on the test diet is at least double the starting mass on test of those breeds of dogs in which the average mature mass of the male does not exceed 10 kg;

c. until the average body mass on the test diet is at least three times the average starting mass on test for those breeds of dogs in which the average mature mass of the male exceeds 10 kg.

4.1.2.3 Feeding - Feed the dogs according to the proposed directions. Use the diet being tested as the sole source of nourishment except for water, and feed the same formulation throughout the test. Offer fresh water ad lib. If a control diet is used, feed it under the same conditions as the test diet. Explain and record any interruptions in the feeding procedures. Maintain records and report all illnesses and medication used during the test procedure. Record the reason for the death of any animal during the trial.

4.1.2.4 Parameters Measured - Measure and record weekly the individual body mass, body length or ulna length.

4.1.2.5 Clinical Observations - Give each pup a complete physical examination as described in par. 7.1 at the beginning and at the end of the trial. The examination and evaluation is the responsibility of a licensed veterinarian.

4.1.2.6 Interpretation

a. The average mass of the dogs shall, as a minimum, fall within the normal ranges of the growth curve of pups for the breed used. The normal growth curve is determined by either:

(i) credible performance data for the particular breed, or

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(ii) a control group fed a diet as described above.

b. No dog shall show nutritional health problems.

4.2 **Cats** - The product must meet the chemical analysis requirements of NRC/NAS and must be fed successfully to animals as per the protocols in this standard.

4.2.1 Chemical Analysis - Must show compliance with the complete NRC/NAS analysis for nutritional adequacy as described by the Committee on Animal Nutrition 1978, of the National Research Council of the National Academy of Sciences (U.S.), Nutrient Requirements of Domestic Animals, No. 13, Nutrient Requirements of Cats (Table 2).

4.2.2 Limited Animal Feeding Studies for Cats - To establish a basis for comparison and to accurately measure the test results, use either a control diet or, where adequate data is available, previous performance curves. A control diet is one that meets nutritional requirements for cats published by NRC/NAS or any other authority on cat nutrition recognized by the CGSB Committee on Nutritional Test Procedures for Pet Foods and one that has been shown by test feeding to be adequate for the growth of cats.

4.2.2.1 Cats - Use a minimum of eight weaned kittens for each test diet. Select the kittens from at least three litters. Equal sex and mass distribution is preferred, but not mandatory for the kittens used in the test. If a control diet is used the litters shall be divided as equally as possible between the diets to meet the minimum number of kittens required.

4.2.2.2. Duration of Test - Start the test when the kittens are not more than ten weeks old and run the test for at least eight consecutive weeks.

4.2.2.3. Feeding - Feed the kittens according to proposed directions. Use the diet being tested as the sole source of nourishment, except for water, and feed the same formulation throughout the test. The test diet may be any number of flavors of the family of the product under test. Offer fresh water ad lib. If a control diet is used feed it under the same conditions as the test diet. Explain and record all interruptions in feeding procedures. Maintain records and report all illnesses and medications used during the trial.

4.2.2.4. Parameters Measured - Measure and record weekly the individual body mass, body length or ulna length.

4.2.2.5. Clinical Observations - Give each kitten a complete physical examination as described in par. 7.1, at the beginning and at the end of the trial. The examination and evaluation is the responsibility of a licensed veterinarian.

4.2.2.6. Interpretation

a. The average mass of the cats shall, as a minimum, fall within the normal range of the growth curves for kittens. The normal growth curve is determined from either:

(i) credible performance data for a particular type of cat, or

(ii) a control group for a diet as described above.

b. No cat shall show nutritional health problems.

5. SIGNIFICANT CHANGE GUIDELINES

5.1 These guidelines apply to both dog and cat food.

5.2 Due to availability and/or cost of ingredients it may be necessary for a pet food manufacturer to change formulations. These guidelines are provided to determine if a significant change has taken place. If significant change has occurred the product must be tested for compliance with the CGSB protocols.

5.3 **Macro Nutrients (Protein, Fat, Fibre, Calcium, Phosphorus)** - For the purpose of certification listing, mean values and standard deviations will be established for each macro nutrient of a product. Provided the average result of any macro nutrient analysis is within a predetermined range (plus or minus two standard deviations), and the standard deviation remains relatively constant, the process from which the product came can be considered "under control". If the results of any subsequent analysis reveals that the average value was not in compliance with the values submitted for certification listing, then it will be necessary for the manufacturer to take immediate steps to bring that product back into compliance to maintain its certification listing.

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If the average result of a macro nutrient analysis was not in compliance with the value submitted for certification listing and the manufacturer did not wish to make the necessary change, then the product would have to be resubmitted for certification listing. (See Note 1.)

6. LABEL REQUIREMENTS AND DEFINITIONS FOR PET FOODS

6.1 **Label Format** - Acts and regulations that establish specific label requirements relating to a wide range of information are set out in provincial and federal acts and regulations.

6.1.2 The names of ingredients used shall not be used in labelling, brand or trade names, or otherwise, so as to misrepresent directly or by implication the identity of an ingredient or the composition of a pet food.

6.1.3 A manufacturer shall not use on the label a statement of identity, vignette, or any other representation, pictorial or otherwise, that has the capacity and tendency or effect of misleading or deceiving purchasers or prospective purchasers with respect to the composition, form, suitability, quality, color, flavor, performance, method of manufacture, or intended use of the product or any of its ingredients.

6.1.4 A label shall contain sufficient legible information to provide a purchaser or prospective purchaser with the common name, brand name and information on the type of product, list of ingredients, feeding instructions, guaranteed analysis and the claimed purpose for which it is suitable (e.g. growth, maintenance, etc. as described in this standard).

6.1.5 When used as part of a pet food name or statement of identity, the name of a particular ingredient shall not be set forth in such a manner as to mislead prospective purchasers into believing that there is a greater proportion of such ingredient in the product than there is in fact.

6.1.6 Any flavor designated on a pet food label must either conform to the name of its source as shown in the ingredient statement or the ingredient statement shall show the source of the flavor.

6.1.7 When an ingredient or combination of ingredients constitutes 90% or more of the total mass of all ingredients of a pet food formula, the name or names of such ingredients may form a part of the product name of the pet food. However, for the purposes of this provision, water sufficient for processing, trace amounts of preservatives and condiments and trace nutrients shall not be considered ingredients. If more than one ingredient is part of the product name, the printed names shall be the same size, style and color.

6.1.8 When an ingredient or combination of ingredients constitutes at least 25% but less than 90% of the total mass of all ingredients of a pet food mixture, the name or names of such ingredients may form a part of the product name of the pet food only if the product name also includes a primary descriptive term such as "meatballs", "fish cakes", "dinner", "stew" or "meal". For the purpose of this provision, water sufficient for processing, trace amounts of preservatives and condiments and trace nutrients shall not be considered ingredients.

6.1.9 When an ingredient or combination of ingredients is below 25% of the total mass of all ingredients of a pet food formula, the name or names of such ingredients may form a part of the product name, only if associated with the term "flavor". For the purpose of this provision, water sufficient for processing, trace amounts of preservatives and condiments and trace nutrients shall not be considered ingredients.

6.1.10 The guaranteed analysis on the label shall include minimum protein, minimum fat, maximum fibre and maximum moisture.

6.1.11 Pet food products that use the CGSB certification mark shall also carry the following statement:

"XYZ Company certifies that this product meets standard CAN2-146.1-M83 through

☐ Complete Animal Feeding Studies

☐ Limited Animal Feeding Studies." (See Note 2)

One of the boxes must be checked: "complete animal feeding studies" if Method 1 is used, and "limited animal feeding studies" if Method 2 is used.

NOTE 1: In a meat-based product, no more than 10% of the mass of animal protein may be replaced by a non-animal protein source if certification listing is to be maintained.

NOTE 2: For private or no-name labels, arrangements can be made to substitute "The manufacturer of this product certifies that it meets... etc."

Withdrawn/Retired

6.2 **Definitions**

Biological Trials (Épreuves biologiques)

Tests designed and specified within the National Standard of Canada CAN2-146.1 to determine if a pet food qualifies for certification listing under this standard.

Blood (Sang) - Vascular fluid of animals.

Brand Name (Marque de commerce)

Any word, name, symbol, or device, or any combination thereof, identifying the pet food of a specific distributor.

Canadian General Standards Board Committee on Nutritional Test Procedures for Pet Foods (Comité de l'ONGC des méthodes d'essai visant la valeur nutritive des aliments pour animaux familiers)

The Committee made up of representatives from pet food manufacturers, veterinarians, humane societies, government agencies, trade associations and public consumers who created and oversee this standard.

Certification (Accrédité)

Attested by the manufacturer, and approved by the Certification Panel, to meet this standard.

Common Name (Nom vulgaire)

Customary, or familiar, name (non-scientific), i.e., dog food or cat food.

Complete and Balanced (Complet et équilibré)

A term that may be applied to a pet food that has all the known nutrients, in proper amounts and proportions, that are required for all stages of the life of a dog or cat.

Complete Animal Feeding Studies (Étude complète de l'alimentation des animaux)

See Method 1 of National Standard of Canada CAN2-146.1.

Container (Emballage)

Any receptacle, package, wrapper or confining bond in which a product is offered for sale.

Control Diet (Régime de contrôle)

A diet that meets the nutritional requirements for dogs (cats) published by NRC/NAS, or any other authority on dog (cat) nutrition recognized by the CGSB Committee on Nutritional Test Procedures for Pet Foods, and which has been shown by test feeding to be adequate for the phase(s) of life being tested for in dogs (cats).

Credible Data (Données plausibles)

Data accepted as valid by the Certification Panel at the time of application.

Diet (Régime)

Pet food ingredient or mixture of ingredients including water, which is consumed by animals.

Distributor (Distributeur)

The person or company whose name and address appears on the label of the pet food.

Evaluation Failure (Rejet)

See details in the Interpretation section of this standard for each individual test.

Facility Auditing (Vérification des installations)

An inspection by a representative(s) of the Certification Panel to determine whether the manufacturer is maintaining production controls that assure continued compliance with the standard.

Withdrawn/Retired

Family of Products (Famille de produits)

Products having the same nutritional profile as described in par. 9.6 of this standard.

Fat (Matières grasses)

A substance composed chiefly of triglycerides of fatty acids, and which is solid or plastic at room temperature.

Flavor Designation (Désignation de la préparation aromatisante)

The identification description, on the label of the pet food, of the main taste; for example, beef flavor, fish flavor, chicken flavor etc.

Formulation (Formule)

The exact and concise compilation of the contents of a product or family of products.

Gestation (Gestation)

Pregnancy.

Growth Curve (Courbe de croissance)

Curve acquired through measuring and recording, for dogs their mass and ulna length and for cats their mass, a statistically viable number of animals of a specific breed, age and category.

Growth Test Procedures (Preuve d'efficacité pour la croissance)

Tests to determine if feed will support the growth of animals. (See Item 1 and Method 1 - (cats or dogs)).

Guaranteed Analysis (Garantie d'analyse)

A printed statement on the package, of the protein, fat, fibre and moisture percentages that the distributor assures is representative of the product.

Illness (Maladie)

An ailment, sickness, disease or disorder, indicated by the licensed veterinarian.

Ingredient (Ingrédient)

A component part or constituent or any combination or mixture making up a pet food.

Ingredient Statement (Liste des ingrédients)

The list of ingredients in descending order of magnitude, using names defined by this standard or the common or usual name. Brand names shall not be used.

Label (Étiquette)

Any label, mark, sign, imprint, device, stamp, brand, ticket, or tag affixed to a container.

Lactation (Lactation)

Secretion of milk to suckle young.

Manufacturer (Fabricant)

The company or person who processes ingredients into pet food.

Mean Value (Valeur moyenne)

The arithmetic mean: the sum of a set of values divided by the number of values in the set. For N values of X, X_1, $X_2 \ldots X_N$,

$$\bar{X} = \frac{\Sigma X}{N}$$

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Medication (Médication)

Any substance or mixture of substances administered for medicinal purposes.

Nutritional Health Problem (Problèmes de santé (carence nutritionnelle))

These will be identified by the Certified Veterinarian in attendance.

Nutritional Profile (Profil nutritionnel)

The amount of moisture, protein, fat, vitamins and micro-minerals established in the current CGSB approved NRC/NAS publications, i.e., Committee on Animal Nutrition, Nutrient Requirements of Dogs, National Academy of Sciences (USA), (Table 1), Committee on Animal Nutrition, Nutrient Requirements of Domestic Animals, No. 13, Nutrient Requirements of Cats. (Table 2).

Pet (Animaux familiers)

For the purpose of this standard, a pet is a dog or a cat.

Preservative (Agent de conservation)

A substance to prevent or retard decay, discoloration or spoilage under conditions of use or storage.

Previous Performance Curves (Courbe de rendement déjà établie)

See Growth Curves.

Primary Descriptive Terms (Termes primaires)

Predominant words used in describing the container's contents or ingredient therein; such as 'meatballs', 'meat-based', 'fish cakes', 'dinner', 'stew', 'meal', 'burger', 'chunk', 'patty', 'cubes', 'rissoles', 'croquettes', and other words of similar ilk, which should be used only to describe a product or ingredient which has a shape or form representative of the description.

Process (Procédé)

The course or method of operation(s) in the production of the feed.

Protein (Protéine)

Any of a large class of naturally-occurring complex combinations of amino acids.

Protocols (Protocoles)

The testing methods and parameters used in proving nutritional claims for cat and dog feeds as detailed in CAN2-146.1-M83.

Stability (Stabilité)

The condition of the product retaining its nutritive value during normal shelf life.

Standard Deviation (Écart type)
A measure of variability defined as the square root of the average value of the squares of the deviations from the mean of the original readings. For N values of X,

$$\sigma = \sqrt{\frac{\Sigma(X - \bar{X})^2}{N}}$$

Statement of Identity (Déclaration d'identité)

A statement in terms of the common or generic name of the product or in terms of its function.

Test Diet (Régime d'essai)

A pet food made of a specific formula, fed to test animals whose physical response will constitute a pass or failure of the test.

Trace Amounts (Quantités négligeables)

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Ingredients measured in milligrams per kilogram (mg/kg) or smaller units.

Trace Nutrients (Oligo-éléments nutritifs)

Nutrients required by animals in only micro amounts (measured in milligrams per kilogram (mg/kg) or smaller units).

Unqualified Representation of Nutritional Adequacy (Efficacité nutrionnelle pour une période illimitée)

A pronouncement on the label of a pet food claiming the product is suitable for all stages of a pet's life.

Vignette (Vignette)

A word picture which delineates subtly and delicately. (Consumer and Corporate Affairs Canada uses the word vignette to imply a pictorial representation.)

7. PHYSICAL EXAMINATION

It is recognized that some of the physical examinations listed may not be appropriate or feasible for very young pups. Moreover although some of the biochemical profile tests are not compulsory in this standard, it is recommended strongly that the decision whether to implement these tests be the veterinarian's professional opinion of their need. Under such circumstances, the manufacturers must undertake the recommended tests. The attached physical and biochemical profile standardizes the examination of dogs and cats on biological trials.

7.1 Examination Protocol

The physical examination requires that each body system be conscientiously and systematically examined by the licensed veterinarian. Problems are to be briefly summarized at the end for quick reference. The examination protocol identifies the items to be examined.

7.1.1 EXAMINATION PROTOCOLS

LABORATORY _____ DATE _____

ADDRESS _____ TRIAL TYPE _____

PHONE _____ TRIAL NUMBER _____

ANIMAL - Name _____ Number _____

Breed _____ Age _____

Mass _____ Sex _____

Immunization _____ Date _____

_____ Date _____

PREVIOUS HISTORY: (e.g., pregnancies, diseases, etc.) _____

_____

_____

_____

_____

CURRENT MEDICATION:

_____

GENERAL PHYSICAL: 1) Temperature _____°C, Pulse_____/min, Resp._____/min

2) Gen. condition _____

3) Gen. behaviour _____

4) Other _____

Withdrawn/Retirée

		Normal	Abnormal
(1) SKIN:	i hair coat	( )	( )
	ii skin	( )	( )
	iii parasites	( )	( )
	iv hydration	( )	( )
	v lymph gland	( )	( )
(2) EARS:	i flap (pina)	( )	( )
	ii canal	( )	( )
	iii ear drum	( )	( )
	iv infection	( )	( )
	v other (eg. pain)	( )	( )
(3) EYES:	i lids	( )	( )
	ii conjunctivia	( )	( )
	iii cornea	( )	( )
	iv sclera	( )	( )
	v iris	( )	( )
	vi lens	( )	( )
	vii retina	( )	( )
	viii other	( )	( )
(4) NOSE:	i nares	( )	( )
	ii discharge	( )	( )
	iii other	( )	( )
(5) MOUTH:	i lips	( )	( )
	ii gums	( )	( )
	iii teeth	( )	( )
	iv tongue	( )	( )
	v palate	( )	( )
	vi pharynx	( )	( )
	vii other	( )	( )
(6) RESPIRATORY:			
	i trachea	( )	( )
	ii auscultation	( )	( )
	iii other	( )	( )
(7) CARDIOVASCULAR:			
	i pulse	( )	( )
	ii cap. refill	( )	( )
	iii arrhythmias	( )	( )
	iv murmur	( )	( )
	v other	( )	( )
(8) ABDOMEN:			
	i bladder	( )	( )
	ii kidney	( )	( )
	iii pros/uterus	( )	( )
	iv intestines	( )	( )
	v colon	( )	( )
	vi spleen	( )	( )
	vii liver	( )	( )
	viii ascites	( )	( )
	ix anus	( )	( )
	x perineal	( )	( )
	xi other	( )	( )
(9) REPRODUCTIVE:			
	i scrotum/testes	( )	( )
	ii vulva/vagina	( )	( )
	iii prepuce/penis	( )	( )
	iv mammary glands	( )	( )
	v other	( )	( )
(10) MUSCULO-SKELETAL:			
	i conformation	( )	( )
	ii locomotion	( )	( )
	iii other	( )	( )
(11) CENTRAL NERV. SYSTEM:			
	i locomotion	( )	( )
	ii append. reflexes	( )	( )
	iii facial reflexes	( )	( )
	iv other	( )	( )

SUMMARY & EXPLANATION OF ABNORMAL FINDINGS: (e.g., 3, vii - retinal atrophy)

(1) Problems:

a. _____
b. _____
c. _____
d. _____
e. _____
f. _____
g. _____
h. _____
i. _____
j. _____

(2) Comments:

a. _____
b. _____

Withdrawn/Retirée

7.2 **Non-Compulsory Biochemical Profile.** The following tests are recommended on a voluntary basis to ensure that healthy animals are used:

	Normal	Abnormal
(1) FECAL:		
i parasites	( )	( )
ii consistency	( )	( )
iii other	( )	( )
(3) BLOOD CHEMISTRY: (min. profile)		
i glucose	( )	( )
ii BUN	( )	( )
iii calcium	( )	( )
iv phosphorus	( )	( )
v serum protein	( )	( )
vi albumin	( )	( )
vii alkaline phos	( )	( )
viii biliribin		
ix SGOT	( )	( )
x SGPT	( )	( )
xi creatinin	( )	( )
xii other	( )	( )
(5) OTHERS: (as required for diagnosis)		
i	( )	( )
ii	( )	( )
iii	( )	( )

	Normal	Abnormal
(2) URINE: (multistix)		
i pH	( )	( )
ii protein	( )	( )
iii glucose	( )	( )
iv ketones	( )	( )
v biliribin	( )	( )
vi blood	( )	( )
vii urobilinogen	( )	( )
viii sediment (clear)	( )	( )
xi if cloudy/bloody-urine sediment	( )	( )
x other	( )	( )
(4) CBC:*		
i WBC	( )	( )
ii RBC	( )	( )
iii differential	( )	( )
iv hemoglobin or Hct	( )	( )
v other	( )	( )

* See Appendix B

8. TREATMENT OF EXPERIMENTAL ANIMALS

All animals used in programs testing the acceptability of pet foods as described in this standard shall be treated in accordance with the principles outlined in the Guide to the Care and Use of Experimental Animals, Canadian Council on Animal Care. These guidelines will serve as a standard to ensure the humane and ethical use of animals. Test reports on protocol testing shall include a statement certifying adherence to these principles.

9. NUTRITIONAL QUALITY ASSURANCE PROGRAM

9.1 The process of manufacturing pet foods to comply with the provisions of this standard requires not only a continuous program of in-plant quality assurance, but also compliance with CGSB 101, Manufacturers Inspection System Requirements for Qualification/Certification Listing Programs . The following are minimum requirements for the stated aspects.

9.2 **Sanitation/Hygiene**

a. Good housekeeping programs, the practice of keeping machinery and areas throughout the facility clean and in good repair, shall be in place and monitored frequently for:

- infestation
- bacteria
- mold.

b. Special attention should be paid to crusty cereal, sugar or oily deposits, as well as to critical plant areas such as walls, floors, cracks, and upon and around process and packaging equipment.

c. Cleaning must be conducted in a manner that avoids spreading and distribution. Cleaning with compressed air should therefore be discouraged. Should it be necessary to use compressed air, it should be clean, dried and filtered. Vacuum cleaners, brooms, brushes, mops, etc., are to be used for most applications.

d. Housekeeping must include the area outside of the plant for elimination of harborages. Examples of these are discarded equipment, pallets, weeds, debris, standing water, etc.

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e. Manufacturers shall have personnel who are trained in microbiology monitor the product and process compliance with the sanitation requirements.

f. Manufacturers shall have a rodent control and elimination program. It shall be available for review on request.

g. Manufacturers must try to keep birds away from the facility, and must prevent them from entering it.

9.3 **Product Safety** - The manufacturer will have in place written procedures to ensure wholesome products free of harmful materials in quantities likely to be deleterious to pets.

9.4 **Manufacturing Control**

a. All processing operations and packaging operations shall be carried out by trained personnel.

b. Supervisory personnel in manufacturing shall be required to be familiar with good food-manufacturing practice and shall be continually instructed on it, as applicable to job function.

c. All processing operations shall be covered by master product formulae which shall be prepared by, and subject to evaluation by technically qualified personnel.

d. The master formulae shall be written to provide not less than 100% of label claim.

e. All processing operations shall be performed according to comprehensive and detailed written procedures.

f. Care shall be taken to avoid contamination of finished product by raw or in process materials.

9.5 **Raw Material and Packaging Material Tests**

a. Each raw material and packaging material shall be covered by a specification.

b. A program of raw material and packaging material inspection and testing shall be documented and available for inspection.

c. Each lot of raw material shall, at a minimum, be inspected visually for compliance to relevant portions of raw material specifications.

d. The records shall state results of tests, with reference to the methods used; show the disposition of rejected raw material; reveal the identity of the testing laboratory; and bear the name and signature of a responsible person in the testing laboratory.

e. Each lot of packaging material shall provide adequate product protection and shall be free from harmful materials that could be transferred to the product.

9.6 **Finished Product Quality Tests** - Each family (Note 3) of finished products shall be analyzed as follows:

Minimum Frequency	**Test**
Once per week	moisture, protein, fat, ash
Once per quarter	calcium, phosphorus, fibre iron, copper, zinc, thiamine (cat food only), vitamin A, vitamin E

NOTE 3: Family - Each company shall establish categories of products which have similar nutritional profiles. "Nutritional profile" is the amount of the following nutrients: moisture, protein, fat, vitamins and micro-minerals established in the NRC/NAS publications listed in par. 2.1.1. One product of each category shall be successfully test fed according to the minimum testing protocols contained within. The nutritional profiles of the other products within each of the categories established shall equal or exceed the nutritional profile of the successfully test fed product within that category as measured on a dry mass basis.

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The test methods used must be recognized and recommended as an authoritative source by the CGSB Committee on Nutritional Test Procedures for Pet Foods, e.g. the Association of Official Analytical Chemists (AOAC).

9.7 **Product Stability (From Plant to Consumer)** - A stability program shall be available which develops and records data for each family of products marketed to demonstrate its stability in the container in which it is packaged, and to determine its normal shelf life or the period of time over which the product remains stable (excluding canned products).

Product stability shall be determined after any significant change in formulation or packaging. Stability data arrived at by accelerated testing may be part of this program.

9.8 **Sampling**

Manufacturing quality control procedures shall describe the sampling scheme that is in place to demonstrate that the manufacturing processes are in control and that each lot/batch conforms to protocol nutritional requirements stated in this standard.

Samples of the final product shall be randomly selected and the sample sizes shall be sufficient to provide 80% confidence that the lot/batch does not deviate from the protocol data by more than 20%. Results of all quality control inspections shall be recorded and maintained on file.

10. NOTES

10.1 The publications referred to in par. 2.1.1 may be obtained from the Printing and Publications Office, National Academy of Sciences, 2101 Constitution Ave. N.W., Washington, DC 20418, U.S.A.

10.2 The publication referred to in par. 2.1.2 may be obtained from the Canadian Council on Animal Care, Suite 1105, 151 Slater St., Ottawa, Ontario K1P 5H3.

10.3 The publications referred to in par. 2.1.3 may be obtained from the Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Canada K1A 0S9. Telephone (819) 997-2560.

Withdrawn/Retirée

APPENDIX A

A. CERTIFICATION LISTING PROGRAM

A.1 The CGSB shall offer to any manufacturer the opportunity to become listed under the Manufacturers' Certification Listing Program for Pet Food and to enter into a licensing agreement to use the CGSB Certification Mark if such manufacturers demonstrate compliance with specification CGSB 101 and all aspects of this standard, CAN2-146.1-M83.

A.2 Manufacturers who wish to enter into the program or agreements agree to abide by all the CGSB requirements relating to this program and agreements and further agree to perform and submit to the following tests and audits:

a. Conformance tests, which shall consist of the applicable protocol testing as listed in Sections 3 or 4.

b. Facility auditing, which shall be the responsibility of CGSB, as listed in par. 5.2 of the Manufacturers Certification Listing Programs; Policies and Procedures (CGSB 103).

A.3 For purposes of continued listing under Manufacturers' Certification Listing Program and Licensing Agreement compliance, the CGSB shall periodically conduct facility audits in order to

a. Monitor or audit the manufacturer's continued compliance to CGSB 101 and this standard;

b. Monitor or audit those analytical test results performed by the manufacturer in compliance with Section 9 of this standard; and

c. Take such samples of products as are deemed necessary for verification of the manufacturer's analytical results.

A.4 Notwithstanding any requirements listed in Sections A.2 and A.3, the Certification Panel may require:

a. When deemed necessary, the manufacturer is to perform or to have performed at the manufacturer's expense:

(i) digestibility tests (Note 4) on his products to indicate continued nutrient availability similar to the availability of the nutrients in the diets used in the protocol tests. For this reason each manufacturer is advised to conduct or have conducted a digestibility test on each product subjected to protocol testing at the time the protocol testing is being carried out;

(ii) additional nutrient analysis (including complete NRC analysis); or

(iii) additional premise inspections; and

b. The CGSB Committee on Nutritional Test Procedures for Pet Foods shall meet annually to:

(i) receive from the Certification Panel advice and guidance on the suitability of proposed changes to this standard;

(ii) to recommend to the CGSB any changes which may from time to time be required in this standard, including possible reduction in the frequency and nature of inspections or on the application of the CGSB Manufacturer's Certification Listing Program or Licensing Agreement.

NOTE 4: As the costs of repeating protocol testing are very high, it is preferable to run digestibility tests if a problem is identified. But these must have a reference point and thus it is advisable they be conducted at the same time as the protocol testing.

Withdrawn/Retiree

APPENDIX B

This Appendix includes information on blood chemistry for guidance purposes. It was developed by and for the Ontario Veterinary College.

The complete blood count (CBC) is a routine feature of any physical examination and supplies considerable information, at low cost, on chronic and acute infections, anemias, pathology of blood-forming organs, parasitism, allergies, etc. The complete blood count measures white blood count, red blood count, differential and hemoglobin or hematocrit.

HEMATOLOGY AND BIOCHEMISTRY REFERENCE VALUES

Blood Entity	Units	Range for Dogs 1)	Range for Cats 2)
Hemoglobin 3)	g/L	126 - 194	80 - 150
Packed Cell Volume (PCV)	L/L	0.37 - 0.55	0.24 - 0.45
Red Blood Count (RBC)	x 10^{12}/L	5.5 - 8.2	5 - 10
Mean Corpuscular Volume (MCV)	fL	62 - 70	39 - 55
Mean Corpuscular Hemoglobin (MCH)	pg	22 - 25	13 - 17
Mean Corpuscular Hemoglobin Concentration (MCHC)	g/L	330 - 360	300 - 360
Erythrocyte Sedimentation Rate (ESR)	mm/h	varies with PCV	
Reticulocytes	x 10^9/L	0 - 2.4	0 - 10.0
Platelets	x 10^9/L	100 - 560	300 - 700
Plasma Protein (TS)	g/L	58 - 76	60 - 80
White Blood Count (WBC)	x 10^9/L	6.6 - 18.4	5.5 - 19.5
Neutrophils, Segmented	%	45 - 76	35 - 75
	x 10^9/L	3.9 - 12.0	2.5 - 12.5
Bands	%	0 - 1	0 - 3
	x 10^9/L	0 - 0.8	0 - 0.3
Lymphocytes	%	10 - 40	20 - 55
	x 10^9/L	1.0 - 5.6	1.5 - 7.0
Monocytes	%	1 - 14	1 - 4
	x 10^9/L	0.1 - 1.8	0 - 0.85
Eosinophils	%	0 - 14	2 - 12
	x 10^9/L	0 - 1.9	0 - 1.5
Basophils	%	rare	rare
	x 10^9/L	rare	rare

1) Conditioned male and female mongrel dogs, 6-24 months of age. Can. J. Comp. Med. 43: 125-131, 1979

2) Conditioned male and female cats.

3) Normally lower in young animals (20-30 g/L Hb less)

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Blood Entity	Units	Range for Dogs 1)	Range for Cats 2)
Calcium	mmol/L	2.50 - 2.99	1.50 - 2.50
Phosphorus	mmol/L	1.07 - 2.81	1.62 - 2.58
Magnesium	mmol/L	0.74 - 0.99	0.62 - 1.03
Blood Urea Nitrogen (BUN)	mmol/L	1.8 - 9.3	7.1 - 10.7
Creatinine	µmol/L	44 - 97	<176.8
Glucose	mmol/L	3.6 - 5.6	3.3 - 5.6
Cholesterol	mmol/L	2.59 - 6.72	1.94 - 3.88
Bilirubin, Total	µmol/L	3 - 14	2 - 17
Free	µmol/L	0 - 5	0 - 15
Conjugated	µmol/L	0 - 0.8	0 - 0.2
Iron	µmol/L	18 - 54	
Total Iron Binding Capacity (TIBC)	µmol/L	54 - 84	
Triiodothyronine (T_3)	nmol/L	0.8 - 3.1	
Thyroxine (T_4)	nmol/L	15 - 53	
Serum Glutamic Oxaloacetic Transaminase (SGOT)	U/L	7 - 18	<20
Serum Glutamic Pyruvic Transaminase (SGPT)	U/L	3 - 20	<15
Alkaline Phosphatase4)	U/L	10 - 56	<50
Creatinine Phosphokinase (CPK)	U/L	50 - 100	48 - 420
Lactic Dehydrogenase (LDH)	U/L	10 - 140	
Amylase	U/L	740 - 1850	1260 - 2040
Lipase (Sigma Tietze Units)	U/L5)	28 - 196	<280
Na	mmol/L	143 - 158	147 - 156
K	mmol/L	3.7 - 4.7	4 - 5
Cl	mmol/L	104 - 116	110 - 123
Osmolality	mmol/kg	295 - 315	282 - 292
Ammonia	µmol/L	59 - 103	
Bromosulphalein (BSP)		1.5% retention @ 45 min	
Hydrocortisone	nmol/L	55 - 221	<30 - 300
Fibrinogen	g/L	1.0 - 3.0	
Blood Pb	µmol/L	0 - 0.01	
Protein Serum	g/L	52 - 64	60 - 80
Albumin/globulin Ratio (A/G)		0.7 - 1.3	0.9 - 1.1
Albumin	g/L	24 - 36	25 - 40
Globulin	g/L	24 - 37	20 - 50
Alpha globulin	g/L	10 - 16	10 - 20
Beta globulin	g/L	8 - 18	5 - 15
Gamma globulin 6)	g/L	3 - 8	10 - 20

4) Higher in young animals

5) Units are being established

6) Low end of range represents neonatal animals

Withdrawn/Retirée