# RWANDA STANDARD

# DRS 557-1

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## Cockroach insecticides — Specification —

## Part 1: Bait formulations



ICS 65.100.10

Reference number

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In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition



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## Foreword

Rwanda Standardsarepreparedby Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 557-1was prepared by Technical Committee RSB/TC 064, *Pesticides*

In the preparation of this standard, reference was made to the following standard:

KS 2671-1: 2017 Cockroach pesticide — Specification — Part 1: Gels

The assistance derived from the above source is hereby acknowledged with thanks.

RS557 consists of the following parts, under the general title *Cockroach insecticides — Specification*:

— *Part 1: Bait formulations*

— *Part 2: Dusts*

— *Part 3: Ready-To-Use (RTU) Sprays*

— *Part 4: Wettable Powders (WP)*

— *Part 5: Emulsifiable Concentrates (EC)*

— *Part 4: Aerosols*

### Committee membership

The following organizations were represented on the Technical Committee on *Pesticides*(RSB/TC 064) in the preparation of this standard.

Paragraph of participants

Rwanda Standards Board(RSB) – Secretariat

## Introduction

Cockroaches are among the most common pests infesting homes and apartments. They are especially troublesome where food is prepared and sanitation is lacking. Cockroaches are repulsive and embarrassing to most people simply by their presence. They may contaminate food, kitchen utensils, and other household items, and they leave an unpleasant odor.

Because cockroaches move freely from filth to food, they can transfer pathogenic microbes that cause food poisoning and other illnesses. Many people are also allergic to cockroach excrement and their shed skins. Cockroach-produced allergens may cause congestion, sneezing and watery eyes, as well as life-threatening bronchial inflammation (asthma) characterized by recurrent cough, wheezing, and difficulty breathing. Asthma triggered by cockroaches is especially common among children living in densely populated housing conditions where infestations are often severe.There are hundreds of insecticide productslabelled for cockroach control inside homes,apartments, and dwellings. In this document, wewill cover the bait formulations used for cockroachcontrol and give advantages and disadvantages ofthe different formulations.Some active ingredients are formulated inmore than one way. For instance, permethrin, acommonly used pyrethroid insecticide, can beformulated as a dust, in granules, RTU, a wettablepowder, an emulsifiable concentrate, an aerosol,and a total-release fogger.

# Cockroaches insecticides— Specification— Part 1: Bait formulations

## 1 Scope

This Committee Draft prescribes the requirements, sampling and test methods for bait formulations used as insecticides against cockroaches in public health settings.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the editioncited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

RS 406, *Pesticides — Terminology*

AOAC 920.12,*Moisture in pesticide formulations*

ASTM D7481-18,*Standard Test Methods for Determining Loose and Tapped Bulk Densities of Powders using a Graduated Cylinder*

ASTM D1067-16,*Standard Test Methods for Acidity or Alkalinity of Water*

*ISO 4833-1+/Amd. 1, Microbiology of the food chain — Horizontal method for the enumeration of microorganisms — Part 1: Colony count at 30 °C by the pour plate technique — Amendment 1: Clarification of scope*

CD xxx-1: 2023,*Packaging of pesticides — Requirements — Part 1: Solid pesticides*

WD xxx:2023,*Pesticides — Guidelines for Good Labelling Practices*

RS 405, *Pesticides — Sampling*

## 3 Terms and definitions

For the purposes of this standardthe terms and definitions given in RS 406 and the following apply.

**3.1**

**bait formulation**

edible or attractivesubstance mixed with an active ingredient

**3.2**

**public health area**

area commonly used by humans as a residence or for work or leisure, including homes, officesand recreational establishments

## 4 Requirements

### 4.1 General requirements

**4.1.1** The product shall be bait formulation insecticides with the addition of effective attractants and other suitable additives, as may be required.

**4.1.2** The bait formulation insecticides shall be in form of solid/granular, gel/paste.

**4.1.3** The bait formulation insecticides shall be free from hazardous material that are of toxicological, ecotoxicological and environmental concerns.

**4.1.4** The bait formulation insecticides for public health shall not contaminate or taint non-target areas when used as recommended.

### 4.2 Composition

**4.2.1** The bait formulation insecticides shall be constituted of the following:

**4.2.1.1 Active ingredients** — Boric acid, hydramethylnon, fipronil, acetamiprid, indoxacarb, abamectin, imidacloprid, noviflumuron, oxypurinol and xanthine, sulfluramid, propoxur and any other active substance approved by competent authority.

**4.2.1.2 Inert ingredients** —The additives that are food grade or of non-toxicological or ecological concern.

**4.2.2** The bait formulation insecticides shall be approved and registered by competent authority.

### 4.3 Specific requirements

The bait formulation insecticides shall comply with the requirements given in Table 1 when tested in accordance with thetest methods prescribed therein.

**Table 1 – Specific requirements for bait formulation cockroach insecticides**

| S/N | Parameters | Requirements | | Test methods |
|---|---|---|---|---|
| | | Granules | Gel | |
| i. | pH | 4 – 7 | 4 – 7 | Annex A |
| ii. | Moisture content | 20 | - | AOAC 920.12 |
| iii. | Density, g/cm$^3$, min. | - | 1.20 | ASTM D7481-09 |
| iv. | Viscosity, mpas.s | - | 30.189 – 30.636 | Annex B |
| v. | Acidity, g/kg ($H_2SO_4$), max. | 0.25 | 0.25 | ASTM D1067 |
| vi. | Alkalinity , g/kg (NaOH), max. | 0.05 | 0.05 | |

| | | | | |
|---|---|---|---|---|
| vii. | Attrition resistance | 1 | - | Annex C |
| viii. | Total viable counts, CFU, Max. | 100 | 100 | RS ISO 4833-1 |

### 4.4 Biological efficacy

**4.4.1** The bait formulation insecticides shall be effective against cockroaches as per the data provided during registration for local use and as per the label instructions. The cockroach behavior and mortality should be observed for 15 days. Within 6 days' mortality of over 50% should be achieved and 100% mortality after 15 days under laboratory conditions.

## 5 Packaging

The product shall be packaged in accordance with the requirements prescribed in CD xxx: 2023.

## 6 Labelling

The product shall be labelled in accordance to the requirements prescribed in WD xxx: 2023.

## 7 Sampling

Representative samples of the product shall be drawn as prescribed in RS 405.

# Annex A
(normative)

# Determination of pH value

## A.1 Principle

The pH value of a mixture of a sample with water or of an undiluted aqueous formulation is determined by means of a pH meter and an electrodesystem.

## A.2 Apparatus

**A.2.1** **pH meter**, capable of at least two points calibration

**A.2.2** **Electrode system,** e.g. glass electrode system, conditioned and stored according to the manufacturer's instructions

**A.2.3** **Measuring cylinder stoppered,** 100 mL

## A.3 Reagent

**A.3.1** **Di-sodium tetraboratebuffer solution 0.05 mol/L,** commercially available or self-solution. Dissolve 19.07 g di-sodium tetraborate ($Na_2B_4O_7 \cdot 10\ H_2O$) in water (2.2) and make up to 1000 ml. Do not keep the solution for longer than one month.

**Table D1 – pH values in relation to temperature**

| Temperature [°C] | 10 | 15 | 20 | 25 | 30 |
|---|---|---|---|---|---|
| pH | 9.29 | 9.26 | 9.22 | 9.18 | 9.14 |

**A.3.2** **Potassium hydrogen phthalate buffer solution 0.05mol/L,** commercially available or self-prepared solution. Dissolve 10.21 g potassium hydrogen phthalate ($HOOC\text{-}C_6H_4\text{-}COOK$) in water and make up to 1000 mL. The temperature coefficient of the pH of this buffer solution can be neglected between 10 °C and 30 °C. Do not keep the solution for longer than one month.

**A.3.3** **Water, distilled or de-ionized,** in equilibrium with $CO_2$ from the air.If necessary, the water used should be freshly boiled and cooled to room temperature.

## A.4 Procedure

**A.4.1** Calibration – Operate the pH meter and the electrode system according to the manufacturer's instructions. Calibrate the measuring system (pH meter and electrode) according to the manufacturer's instructions using at least two appropriate buffer solutions.

**A.4.2** Measurement of pH values:

**A.4.2.1** ***Measurement of diluted samples*** — Weigh 1.0 g of sample (NOTE1) into a measuring cylinder containing about 50 mLwater (NOTE 2), make up to 100 mL with water and shake vigorously until completely mixed or dispersed. If necessary, transfer the solution or dispersion to a beaker (200 mL) and allow any suspended material to settle for 1 min. Ensure that the temperature of the sample/water mixture does not differ from the temperature of the borate buffer used at the time of calibration. Immerse the electrode into the liquid and measure its pH without stirring. Record the pH value after 1 min. If the pH value changes more than 0.1 pH unit during this equilibration time, record the pH 10 min after immersion of the electrode (NOTE 3).

**A.4.2.2** ***Measurement of undiluted aqueous formulations*** — Transfer enough sample to a beaker (100 mL). Continue as for (i) Measurement of diluted samples beginning at: 10

**A.4.3** Reporting of the results — Give the result to the nearest 0.1 pH unit and report the following conditions:

a) the concentration of the mixture that has been measured (normally 1 % w/v, or 1 % v/v for liquid samples).

b) whether or not the pH has been measured in an undilutedsample.

c) the type of water that has been used.

d) the temperature at which the pH has been measured.

NOTE 1 In case of liquid samples which are not too viscous, e. g. emulsion concentrates, 1 mL(or more) of the sample may be used.

NOTE 2 Special types of water instead of distilled or de-ionized water may be prescribed.

NOTE 3 During the measurement of pH values of samples a randomly fluctuating reading of the pH meter may be observed. The reason is normally that the concentration of ions in the sample (diluted or undiluted) is too low, or because of an interaction between the particles or droplets in suspension with the electrode. If the ion concentration is too low, some drops of a concentrated sodium chloride solution may be added to stabilize the reading.

# Annex B
(normative)

# Determination of viscosity by Brookfield method

## B.1 Principle

The Brookfield viscometer measures viscosity by measuring the force required to rotate a disk in the fluid. Pastes and gels are thick and difficult to immerse disks into the samples without trapping air. Helipath accessory and the spiral adaptor have been developed to overcome the obstacles. The Helipath accessory consists of motorized drive that slowly lowers then rises the viscometer head so that a slowly rotating T-bar spindle sinks into the sample to a preset depth, then rises back to the sample surface. The spindle continuously cuts through a fresh sample during measurement as the gel is penetrated hence the gel structure contributes to the torque sensed and consequently the measured viscosity.

## B.2 Apparatus

**B.2.1** **Brookfield digital viscometer**, model DV-II or equivalent.

**B.2.2** **Wide mouth 8 oz sample jar**,(O. Berk cat No. 1AC08F8) or equivalent.

**B.2.3** **Spindle as designated**.

**B.2.4** **Calibrated thermometer**, graduated 0.1 ºC.

**B.2.5** **Water bath**, capable of maintaining required temperature to ±1 ºC.

## B.3 Reagents

**B.3.1** **Viscosity standard,** Brookfield engineering laboratories or equivalent.

**B.3.2** **Test sample gel.**

## B.4 Procedure

**B.4.1** Calibrate the viscometer using the standard viscosity solution.

**B.4.2** The sample container and quantity should be approximately the same as the calibration standard. Equilibrate the temperature of the sample to the temperature designated in the specification ±1 ºC.

**B.4.3** Confirm that the viscometer is level using the bubble level on the back of instrument.

**B.4.4** Auto zero the instrument with no spindle attached and the speed set as designated in the product specification.

**B.4.5** Immerse the spindle designated in the product specification into the sample to the groove of the spindle shaft and attach the spindle to the viscometer. The spindle should not touch the bottom or the sides of the container and should be centered. Reconfirm the viscometer level.

**B.4.6** Choose the units by pressing the desired unit key (CPS for centipoises).

**B.4.7** Set the speed as designated in the product specification, start the viscometer and read viscosity which the instrument acquires a constant value.

# Annex C
(normative)

# Determination of attrition resistance

## C.1 General

The method is suitable for determining the resistance attrition under defined conditions. Attrition is defined as change of granules surface and the refraction by jarring impact. The granules are circulated /turned around in a rotating dish a build-in, bow-shaped baffle.

## C.2 Apparatus

**C.2.1** ***Attrition tester*** – Ensure that the material of the drum is not subjected to static electricity buil-up.

**C.2.2** ***Sieve plate*** in accordance with ISO 3310-1, 2mm sieve (stainless steel).

**C.2.3** ***Balance***

**C.2.4** ***Stopwatch***

## C.3 Procedure

### C.3.1 Determination

Take a sample of sample of granules representative in terms of particle fraction and moisture content (about 65 g) and remove any dust by sieving using a 0.125 mm sieve. The mass of the residue on the sieve to be used for the measurement should be at least 60 g. Weigh (to the nearest 0.01 g) the sample (**E** g) and transfer it to the dish of the friability tester. Turn the dish for 100 rotations (about 4 min). Then transfer the sample to a 2 mm sieve and sieve. Discard the fraction that passes through the sieve and weigh the residue together with the particles that remain adhered to the sieve (*R* g).

### C.3.2 Calculation

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Attrition = $\frac{E-R}{E} x\ 100\%$

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Where:

*E* = mass of sample (g)

*R* = mass of residue on the sieve (g)

# Bibliography

[1] ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*, 2016

[2] ISO/IEC TR 10000-1, *Information technology— Framework and taxonomy of International Standardized Profiles— Part 1: General principles and documentation framework*

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