codeac SOLUTIONS

OPERATING MANUAL

Colorimetric Test for Nuclear Materials
Uranium | Plutonium | Americium | Cobalt

Products: Multi-use bottles, Single-use Ampules, Nuclear Detection Wipes, and Water Tests

Date: 17th January 2024

Scan here for Safety Data Sheet

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CONTENTS PAGE

OPERATING MANUAL

Product: Codeac Solutions Nuclear Detection Products ('The Product' or 'This Product')

Section 1: Overview

1.1 Purpose of the document

This Operating Manual specifies the intended use, test guidance, and precautions to ensure the safe, effective, and responsible use of the Product. This document is intended to be read in conjunction with the Safety Data Sheet, Instruction Card, Color Standard Cards and Product packaging. This document provides information pertaining to all of Codeac Solutions Products including the Nuclear Detection Wipes, Single-use Ampules, Multi Use Bottles and Water Tests. It covers the sampling procedure required for dry / solid samples, liquid/ soil samples and combination samples, as each product has specific direction for use.

1.2 Intended use of the Product

Codeac Solutions Colorimetric Test for Nuclear Materials is a Presumptive Test (Go/No-Go) that provides the end user with a visual color change when our Codeac Liquid Solution is in contact with Uranium, Plutonium, Americium, and Cobalt or Primary Transition Metals. All positive or unconfirmed screening test results should be verified using a confirmatory testing process / radiation or nuclear detection instrument and/or advice from experts in the field.

The intended use of the Product is to simplify the process of detecting specific radioactive species and metals and is primarily to detect alpha and beta emitting radionuclides chemically (by their elemental nature). In the field, it is often easier to detect these radionuclides chemically, rather than radiometrically.

This test is intended to complement other radiological and nuclear detection equipment which increases organizational ability to detect nuclear materials. The outcomes of the Presumptive Test result will provide the user with a Go/No-Go decision as to whether the results need be confirmed with other complementary radiation and nuclear detection instruments or require specialist support to manage the potential contamination threat in accordance with relevant authorities. If a visual color change is present, this indicates the presence of specific radionuclides or primary transition metals that warrants further investigation.

This test is **not** intended for people who have a Color Vision Deficiency as this may limit or preclude an accurate interpretation of the result. The user must comply with all directions provided in the **Operating Manual** ("this document"), on the **Instruction Cards and Color Standard Cards**, the information detailed within the **Safety Data Sheet**, and details included on the **Product packaging** for the safe and effective use of the Product.

In order to reduce the possibility of cross-contamination, the user should follow the **"Sampling and Testing Guidance" section** included in this Operating Manual. When interpreting the results, the users should follow and refer to the **"Test Results and Color Standard Table" section**, as well as the **"Interpreting the Test Results" section** provided in this Operating Manual.

It is imperative that radiological and nuclear contamination safety precautions, procedures, and processes of the respective organization or the relevant authorities' guidelines and requirements are utilized during the collection and testing of all samples. Users must also consult with the relevant government agencies and authorities prior to disposal of any radiological and nuclear waste materials.

1.3 Detection Capabilities

Codeac Solutions Colorimetric Test for Radionuclide Materials (“the Test”) delivers an immediate visual color change when Codeac Liquid Solution is in contact with identifiable amounts of Uranium, Plutonium, Americium and Cobalt or Primary Transition Metals (refer to minimum detection limits below).

The Test detects the specified elements not the isotopes.

Our proprietary solution enables the quick, convenient, and accurate detection of nuclear materials across a wide range of applications and environmental conditions. The Test is a presumptive / screening detection test, where it alerts the user to the potential presence of specified radionuclides and is designed to detect and identify elemental nuclear materials by changing color.

In summary, Codeac Solutions Colorimetric Test detects the following:

- **Radionuclides:** The elements and therefore associated isotopes of the following: **Uranium** (U-233, U-234, U-235, U-236, U-238), **Plutonium** (Pu-238, Pu-239, Pu-240, Pu-241, Pu-242, Pu-244), **Americium** (Am-241, Am-243), and **Cobalt** (Co-60).
- **Primary Transition Metals that may be of interest:** Copper, Zinc and Nickel. Codeac detects these primary transition metals at levels that may be considered harmful.

Please refer to the **“Terminology” section** for a summary of the above radionuclides and transition metals and the **“Sampling and Testing Guidance” section** for a more detailed Color Standard Card and various detection thresholds based on concentration for specific radionuclides and primary transition metals. The minimum detection limit and associated detection color is included in Table 1 below.

TABLE 1 – Summary Table of Min Detection Limits

Element	Negative	Min. Positive Detection Color	Recommended Min. Detection Limit
Uranium			2.4 parts per million (ppm)
Americium			2.4 parts per million (ppm)
Plutonium			242 parts per million (ppm)
Cobalt			590 parts per billion (ppb)
Primary Transition Metal			Cu – 635 parts per billion (ppb) Nickel – 587 parts per billion (ppb) Zinc- 654 part per billion (ppb)

All Codeac’s Product are a colorimetric test and therefore the user **must** be able to clearly distinguish between different colors to accurately interpret a result. Conditions such as Color Vision Deficiency (color blindness) may limit or preclude an accurate interpretation of the result.

Scan here for Safety Data Sheet and other documents

Section 2: Safety and Handling

2.1 Overview

This section should be read in conjunction with the **Instruction Card, Color Standard Card, Safety Data Sheet, and the product packaging** for specific direction on each Codeac product. Users must also consider the existing processes of the respective organization or the relevant authorities' guidelines and requirements for the safety and management of nuclear material contamination. This section provides guidance for users when conducting a Water Test, Soil Test, Liquid/ Solid Test and Wet Wipe Test.

All Codeac Solution Products are further detailed in the Appendix.

2.2 Safe Handling

The Product is a chemical solution that contains a flammable chemical (ethanol) which must be handled in accordance with the **Instruction Card, Safety Data Sheet, and the product packaging**.

Please also note that an active screening for nuclear or radionuclide contamination and other heavy metal contamination have inherent risks and should be conducted in accordance with the regulations and guidance of national and/or state authorities or the organization – including the use appropriate personal protection equipment.

For the detailed safety precautions and requirements, refer to the Safety Data Sheet provided to the client/procurement entity at the time of shipment or scan the QR code on the top right of this page.

If for any reason the **Safety Data Sheet** is not available, please use the contact email included in the "Contact Information" section of this Document to request a PDF copy of the **Safety Data Sheet.**

Please note that each Codeac Solutions Product contains multiple single-use tests items, and the user must not use a test components more than once, to ensure compliance with the safe handling instructions and the **Safety Data Sheet**.

2.3 Safe Storage

The Product is a chemical solution that must be stored in accordance with all applicable legal requirements. Where applicable, storage conditions must meet those outlined in the Safety Data Sheet and where relevant, any permit/license requirements.

2.4 Disposal

The Product must be disposed of in accordance with the requirements outlined in the **Safety Data Sheet** and all applicable organizational and legal requirements.

Users must consult with the relevant government agencies and authorities prior to disposal of any radiological and nuclear waste materials.

Section 3: Sampling and Testing Guidance

3.1 Overview of Codeac's products

This section provides a short overview of Codeac Solutions products. It also provides guidance for their use in sampling and testing that should be considered alongside organizational and national authorities' requirements and regulations. This entire section should be read in conjunction with the **Instruction Card**, **Color Standard Card**, **Safety Data Sheet** and the **product packaging**.

Codeac Solutions has the following products available that can be used for **dry /solid sample**:

- **Nuclear Detection Ampule Kit:** A compact kit with 16 plastic single-use ampules (2ml each of Codeac's Liquid Solution) that is utilized with 16 dry-wipes and ancillary components. Each dry wipe provides a quick way to sample a discrete surface areas with one test. The ruggedized ampules provide a greater robustness in field conditions and enable the kit to be broken-down into single tests for pocket use.
- **Nuclear Detection Bottle kit:** A compact kit with a 1oz (30ml) glass bottle of Codeac Liquid Solution that is utilized with 16 dry-wipes and ancillary components and the bottle provides for 16 individual tests. Each dry wipe provides one test and a quick way to sample a discrete surface areas.
- **Nuclear Detection Wipe Kit:** A compact kit with 20 individual pre-soaked wipes containing Codeac Liquid Solution and ancillary components. The pre-soaked wipes allow a single wipe to be carried discretely in a pocket and to be conveniently utilized on a single surface area for one test.

These products designed for solid sampling can be used in damp and small quantities of liquid that can be absorbed into the wipes.

The products specifically designed for **liquid/ soil sample** use are:

- **Nuclear Detection Water Testing Kit :** A field kit with 5 individual water tests and ancillary components. The sampling beaker, syringe, and filter enables testing of 10 ml water samples. Each individual water test contains 1 ampule of 2 ml of Codeac Liquid Solutions enables a 10ml transparent liquid sample to be tested.

Further details about our products are included in the Appendix.

3.2 Overview of our Sampling and Testing Guidance

This section will cover the sampling and testing procedures for each of our types of kits/ test types, as there are some differences when conducting either dry/solid or liquid/soil sampling. This section is structured into the following sections:

Section 3: Sampling and Testing Guidance (continued)

3.3 Before conducting a Test / taking a sample

Please note that this guidance is product agnostic unless otherwise specified and updates can be found at www.codeacsolutions.com

The User should follow all the details included on the Instruction and Color Standard Cards for specific instructions of how to utilize each Codeac Solutions product.

Scan here for Instruction Card and Color Standard Card for all our kits

1. **Dry / Solid Test – Instruction Card**
2. **Wet Wipe Test – Instruction Card**
3. **Soil / Water Test – Instruction Card**

Conduct a risk assessment and review organization's policies and procedures. Conduct a risk assessment to consider the threat of potential nuclear contamination and consider the suitability of this product or other radiological / nuclear detection instruments based on your intended use. Review and wear any **protective equipment** that could be required should the risk be high in relation to potential for nuclear contamination. Review your **organization's policies and procedures** around testing and sampling and follow accordingly.

Expiry date. Before conducting a test, please check the expiry date of the solution, which is located on the **product packaging**. All out-of-date products/solution must be disposed of in accordance with the **Safety Data Sheet** and respective government authorities' requirements and regulations. The ancillary components of the kit should be recycled where possible or disposed. These items **should not be reused** with other Codeac Solutions products.

Prepare your Kit and review documentation. Before taking a sample, prepare the kit and components by pre-marking sample bags with key details, ensure all the components are ready to conduct a Test and reviewing the relevant documentation including Instruction Card, Color Standard Card, Safety Data Sheet, product labels and this Operating Manual in advance.

Types of samples. Our Codeac products can be utilized on solids and liquids in the environment. Examples where samples can be taken may be are further described below:

A. **Dry / Solid Samples** including dust/surface particles on a bench, chair, door handle etc. Note that the best results will be achieved by swabbing for dust rather than applying force to a solid using dry surface wipe. The following kits can be used for this sample type: **Bottle Kit, Detection Wipe, Ampule Kit.**

B. **Liquid / Soil Samples** including water from sources such as tap water, streams, puddles, lakes etc. Codeac has application in predominantly water-based samples (e.g. not oil), therefore liquid samples that are of an extremely dark color are unlikely to be successfully interpreted without a separation / filter technique being applied (see the "Conducting a Test" section for further detail). The following kits can be used for this sample type: **Water Testing Kit**

C. **Combination Samples** including solids in a very small amount of liquid such as water residue in a sink, basin, container, or the top of a shipping container or industrial drum. Both the Codeac Solutions bottle/ampule and water tests are suitable for this depending on the amount of water available for the sample. However, the best results will occur with several small drops of the sample on to the dry surface wipe rather than soaking the wipe completely. The following kits can be used depending on sample type: **Water Kit, Bottle Kit, Detection Wipe, Ampule Kit.**

Sample area. Avoid sampling in environments where primary transition metals are present at high levels (e.g., copper mines, water from extremely oxidized pipes, nickel tailings, or zinc from industrial smelters) as this may cause a potential color change (pink at high levels or in extreme concentrations for copper – light purple).

Section 3: Sampling and Testing Guidance (continued)

3.4 Conducting a Test

Valid Test Time for all products. Allow up to 60 seconds for the colorimetric change / reaction to occur. It is important to observe the test continuously over the 60 seconds as many reactions happen instantly; but some will take the 60 seconds to form. Test results are valid for 5 minutes. Should users seek to confirm results beyond 5 minutes, such as forensic applications – please contact Codeac Solutions for further information.

Avoid Potential Interferences. When taking samples / conducting a Test ensure that the sample is not exposed to certain plastics (e.g. polyester, nitrile, HDPE) or petroleum-based products or oils as this could cause a pink coloration due to leaching of the color caused by ethanol in the solution. This effect can be in found in both solid and liquid samples, so heavy concentrations of diesel or petroleum in water may also have a pink coloration. A potential interface to avoid is ink, as the ethanol in the solution may leach the ink color into the result on the smear.

1. Considerations for taking a dry / solid sample test:

Using a Dry Surface Wipe: To reduce possible cross-contamination, users must always limit contact with the wipe as far as possible. Users must always use a dry surface wipe (without the solution) to collect a sample or to wipe an area that is suspected of specific radionuclides and primary transition metals.

Taking a Sample: When taking a sample with a dry surface wipe, open the test results bag containing the dry surface wipe and apply to the surface or substances that you intend to test using a light sweeping motion. For testing small samples of liquids, blotch the wipe in the sample liquid that you intend to test.

> Remember to not obscure/ saturate the wipe with too much of a sample material to prevent not being able to determine a colorimetric change on the wipe (e.g., do not add thick mud over the entire smear as it will be difficult to visually observe a color change.)

Apply Codeac Liquid Solution. Apply controlled drops of Codeac Liquid Solution to the centre of the dry surface wipe after so that an accurate visible color assessment can occur. Only apply drops until the sample material is lightly saturated. For ampules, this is the full amount of solution provided. Please note that if using a bottle, overapplication of Codeac Liquid Solution may result in overwhelming the wipe with Codeac Solutions' bright yellow color, which could interfere with the interpretation of the results. Therefore, apply controlled drops one at a time to avoid oversaturation.

2. Considerations for a wet wipe sample test (also for dry / solid samples):

Using a Pre-Soaked Detection Wipe: To reduce possible cross-contamination, users must always limit amount of contact with the wipe as far as possible. To reduce evaporation of the pre-soaked detection wipe, users must identify the area to sample prior to opening the packaging. The pre-soaked detection wipe should only be utilized on one surface area and should an additional surface need testing, another detection wipe should be utilized.

Taking a Sample: When taking a sample with a nuclear detection wipe tear open the pre-soaked detection wipe packaging, remove the wipe and apply to the surface or substances that you intend to test using a light sweeping motion. For testing small samples of liquids, blot the wipe in the sample liquid that you intend to test.

> Remember to not obscure/ saturate the wipe with too much of a sample material to prevent not being able to determine a colorimetric change on the wipe (e.g., do not add thick mud over the entire smear as it will be difficult to visually observe a color change.)

Section 3: Sampling and Testing Guidance (continued)

3.4 Conducting a Test (continued)

3. Considerations for taking a water / soil sample:

Allow sediment to settle. The water test requires the sample liquid to be translucent to allow for a visual interpretation of a color change. To do so, after taking a water sample it is best to remove sedimentation and obstructions by letting the sample settle/separate in the beaker/container. Note that the best results will be achieved when sedimentation is skimmed off or separated to allow a transparent liquid sample for colorimetric interpretation about five (5) minutes.

Using a syringe. After the sediment has settled in the beaker, use a syringe to draw a 10 ml sample from the water source.

Using a filter. Load water sample in syringe and then secure filter onto the syringe tip. Slowly push the water sample through the filter membrane into the mixing tube. The filter will filtrate the water sample as it is being added into the mixing tube. Should the syringe and filter become difficult to push due to pressure, attach a supplementary unused filter to continue making a water sample. **Ensure to not over pressurize the filter to avoid any potentially contaminated solution to disperse.**

Add Codeac Liquid Solution. Add the entire contents of the Codeac Liquid Solution to the water sample.

Mix Codeac Liquid Solution with the water sample. When mixing the sample with Codeac Solutions in the mixing tube, it is important to ensure the lid is closed firmly to prevent spillage. Mix the sample well with a vigorous shake to ensure Codeac is exposed to the whole sample.

Do not reuse items in the kit. The filters, beakers and syringes are only intended to be used once.

3a. Additional considerations for soil tests:

Soil tests. There are instances where a sample may have a combination of liquid and solids, where the solids may be difficult to separate for testing. An example of this may be soil. This matter can be tested by Codeac Solutions' products via the following steps;

- Place 15 grams of sample soil into the beaker.
- Add 30 ml of filtered / clean /distilled water into the beaker and stir.
- Allow the sample to settle for a minimum of five (5) minutes
- Draw the sample water and soil mixture using the syringe
- Secure the filter to the syringe tip then slowly push the water sample through the filter into the mixing tube
- Add the Codeac Solution from the single-use ampule into the mixing tube
- Seal the lid on the mixing tube
- Mix the sample using a vigorous shaking technique.
- Allow sixty (60) seconds for a the colorimetric to change to develop
- Compare to the Color Standard Card

4. OTHER: Considerations for combinations samples:

Please note that this is a rudimentary separation technique and is not recommended for general use. It should be conducted by testing professionals in conjunction with other radiological instrumentation.

Combination Samples. There are instances where a sample may have a combination of liquid and solids, where the solids may be difficult to separate for testing e.g. a very small amount of liquid such as water residue in a sink, basin, container, or the top of a shipping container or industrial drum. The best results for conducting a test will occur with several small drops of the sample on to the dry surface wipe rather than soaking the wipe completely.

Section 3: Sampling and Testing Guidance (continued)

3.5 Interpreting the Test Results

Identifying the Color. This is a presumptive screening (Go/No-Go) Test. It alerts the user to the potential presence of specific radionuclides and primary transition metals by identifying a visual color change. The positive detection of the specified elements is determined by:

- The transition or change of the test colors; and
- The resulting or end color change of a test on the sample wipes / water test.

Please note that watching the Codeac Solutions being applied to the sample is important to observe the full change in color.

Remember that low light conditions may make identification of the color difficult and that all Codeac's Product are a colorimetric test and therefore the user must be able to clearly distinguish between different colors to accurately interpret a result. Conditions such as Color Vision Deficiency (color blindness) may limit or preclude an accurate interpretation of the result.

The colors and transitions are provided on the **Color Standard Card** and **Test Results Color Standard Table** for quick reference. Both of these remain the primary reference for interpreting results. The following table provides additional information on the transition of colors by elemental concentration. Only the colors and transition defined in the color standard are valid for positive detection of the elements defined within the intended use of the Product.

Throughout this document, Codeac Solutions utilizes volumetric measurements for the purposes of colorimetric detection at trace level. This is to provide consistency of data across both liquid and solid tests as a chemical solution we have provided additional detail around this in the **"Measurements"** section. Indicative conversions to other measurements can be provided on request and for more information, please contact the Codeac Team.

It is important to note that for every color, the shade and hue may vary slightly from test to test depending on the variable color of the environmental samples and the color will deepen as the test dries.

If the user perceives or identifies a different colorimetric response that is not within the stated color detection of intended use, the user should seek additional radiological instruments or specialist support in accordance with relevant authorities.

Section 3: Sampling and Testing Guidance (continued)

3.5 Test Results and Color Standard Table

The table below details the Color Standard and various detection thresholds for specific radionuclides and primary transition metals. This is to be read in conjunction with Color Standard Card provided in your kit. Refer to the **"Measurements" Section** for further detail around this.

Uranium Detection by Concentration

Negative	2.4 ppm (1E-5ML) (6E-2 Bq/mL)	24 ppm (1E-4M) (6E-1 Bq/mL)	238 ppm (1E-3M) (6E+0 Bq/mL)	2.4 ppt (1E-2M) (6E+1 Bq/mL)	Detection Limit, Smear	Detection Limit, Water	Environmental Background levels, soil	EPA limits in Water	EPA limits in Humans
					2.4ppm	2.4ppm	30ppb	30ppb	1.5ppb
	Positive Detect								

Americium Detection by Concentration

Negative	2.4 ppm (1E-5M) (1.8E+4 Bq/mL)	24 ppm (1E-4M) (1.8E+ Bq/mL)	243 ppm (1E-3M) (1.8E+6 Bq/mL)	2.4 ppt (1E-2M) (1.8E+7 Bq/mL)	Detection Limit, Smear	Detection Limit, Water	Environmental Background levels, soil	EPA limits in Water	EPA limits in Humans
					2.4ppm	2.4ppm	15 pCi/L	15 pCi/L	15 pCi/L
	Positive Detect								

Plutonium Detection by Concentration

Negative	2.4 ppm (1E-5M) (3.5E+2 Bq/mL)	24 ppm (1E-4M) (3.5E+3 Bq/mL)	242 ppm (1E-3M) (3.5E+4 Bq/mL)	2.4 ppt (1E-2M) (3.5E+5 Bq/mL)	Detection Limit, Smear	Detection Limit, Water	Environmental Background levels, soil	EPA limits in Water	EPA limits in Humans
					242ppm	242ppm	15 pCi/L	15 pCi/L	15 pCi/L
			Positive Detect						

Cobalt Detection by Concentration

Negative	590 ppb (1E-5M) (2.5E+7 Bq/mL)	5.9 ppm (1E-4M) (2.5E+8 Bq/mL)	59 ppm (1E-3M) (2.5E+9 Bq/mL)	590 ppm (1E-2M) (2.5E+10 Bq/mL)	Detection Limit, Smear	Detection Limit, Water	Environmental Background levels, soil	EPA limits in Water	EPA limits in Humans
					590ppb	590ppb	0.2ppm	<2ppb	<2ppb
	Positive Detect								

Section 3: Sampling and Testing Guidance (continued)

3.5 Test Results and Color Standard Table (continued)

The table below details the Color Standard and various detection thresholds for specific radionuclides and primary transition metals. This is to be read in conjunction with Color Standard Card provided in your kit. Refer to the **"Measurements" Section** for further detail around this.

Primary Transition Metal Detection by Concentration – Copper, Nickel, Zinc

Negative	Cu – 635 ppb (1E-5) (635 ug/L) Ni - 587 ppb (1E-5) (587 ug/L) Zn – 654 ppb (1E-5) (654 ug/L)	Cu – 6.4 ppm (1E-4) (6.4 mg/L) Ni – 5.9 ppm (1E-4) (5.9 mg/L) Zn – 6.5 ppm (1E-4) (6.5 mg/L)	Cu – 63.5 ppm (1E-3) (63.5 mg/L) Ni – 58.7 ppm (1E-3) (58.7 mg/L) Zn – 65.4 ppm (1E-3) (65.4 mg/L)	Cu – 635 ppm (1E-2) (635 mg/L) Ni - 587 ppm (1E-2) (587 mg/L) Zn – 654 ppm (1E-2) (654 mg/L)	Detection Limit, Smear	Detection Limit, Water	Environmental Background levels, soil	EPA limits in Water	EPA limits in Humans
					Cu, 635ppb **Ni**, 587ppb **Zn**, 654ppb	**Cu**, 635ppb **Ni**, 587ppb **Zn**, 654pb	**Cu,** 2 - 4ppb **Ni,** 3ppm -1ppt **Zn**, 10-300ppb	**Cu,** <1.3ppm **Ni,** <100ppb **Zn**, 5ppb	**Cu,** <1.3ppm **Ni,** 1-3ppb, urine **Ni**, 0.2ppb, blood **Zn**, 0.8 - 1.2ppm

Positive Detect

Section 3: Sampling and Testing Guidance (continued)

3.5 Interpreting the Test Results (continued)

Results. All results are referencing the Color Standard Card regardless if it is a solid or liquid test.

- **Positive results:** Any positive screening test result should always be confirmed using a confirmatory testing process and either using complementary radiological instruments or seeking specialist support to manage the potential contamination threat in accordance with the relevant authorities.
- **Inconclusive results:** If any result is inconclusive, the user should conduct a second test using the same sample area. To determine the most distinct difference in color, the user can also use "Neat Codeac Solution" on a wipe to provide a real-time comparison.
- **Multiple results:** On the occurrence that there is more than one specified element detected, the color is likely to be that of the element that is the most prevalent in the sample. On a solid sample test, there is likely to be streaks of each color however, on a water sample test there may be a mixed color and you should seek further testing if there are inconclusive results.
- **Unspecified results:** If there is a different colorimetric response that is not indicated in the Color Standard Card / Table or Operating Manual, the user should seek additional further radiological instrumentation testing or seek specialist support to confirm if there is or is not contamination. Codeac Solutions Technical Team may also be able to provide non-urgent assistance. Contact details are outlined in the **"Contact Information" section**.

False Negative/Positives: It is important to remember that any wipe or swab test can be susceptible to false negatives due to improper or inadequate swabbing technique. Therefore, it is recommended that Codeac Solutions be used in conjunction with other radiological instruments and detection systems where available. The positive colorimetric change occurs at and above the recommended minimum detection limits. There is currently no evidence suggesting false positives or negatives occurring, except for the instances of interferences listed on the next page. If in doubt, however, always seek specialist support.

Section 3: Sampling and Testing Guidance (continued)

3.5 Interpreting the Test Results (continued)

Interferences. There are some identified interferences, which are further detailed below:

- **Interferences from extreme levels of copper or cobalt.** There are instances of visual interferences for positive detection of Uranium from primary transition metals that may occur at extreme man-made levels and are not naturally found in the environment. This has been found specifically at extreme levels (well-above environmental and safe drinking water standards) of copper and cobalt. If Codeac comes into contact with either of these items and the levels indicated below, it may result in a purple or pink/ purple color like the visual interpretation of purple for Uranium.

  Further details are included below:

  - Copper present at extreme levels between 470ppm to 4.7ppt presents a dark magenta pink. Concentrations of toxic copper can be found in mining, fungicides that have copper sulfate, uncoated copper pipe, copper kettles used in cooking, and acidic water sources which could dissolve copper in the earth's crust.
  - Cobalt at greater than 590ppm to 0.2ppt presents as a red /rust colour at 1E-1M. Concentrations of toxic Cobalt can be found in mining, super alloys in orthopedic implants, and ionizing radiation from Co-60.

Interference from Plastics / Ink / Petroleum based product other than Polyethylene, Teflon and Polypropylene are likely to cause a pink hue due to the ethanol leaching the ink from those materials, which may interfere with Codeac's detection of primary transition metals (Copper, Zinc, and Nickel). This reaction can be readily avoided and is covered within the **"Sampling and Testing Guidance"** section.

Any test that turns purple should be considered positive and confirmation should be sought with complementary radiological instrumentation or specialist support.

Section 3: Sampling and Testing Guidance (continued)

3.6 Completion of the Test

After the test has been conducted, complete the details on the results label provided in your relevant kit (examples below) and ensure to follow your respective organization or the relevant authorities' guidelines and requirements around recording the test results.

It is important to record results as we **do not guarantee that results are valid after 5 minutes** from taking a sample and specialists may seek the expired test sample for subsequent forensic analysis by accredited authorities..

If the test is positive for the specific radionuclides and primary transition metals, the bag with the sample or the mixing tube containing the liquid should be treated with caution and disposed of in accordance with the relevant national and state authorities and regulations for potentially radioactive material/waste.

Each Codeac test should only be used once to ensure accurate sampling and testing.

Dry / Solid Samples can be disposed of / resulted recorded in Test Results Bags provided in the kits or an alternative method provided by your organization.

Liquid/ Soil Samples can be disposed of / results recorded in the mixing tube where the test was conduct or an alternative method provided by your organization. Always ensure the lid is tightly sealed.

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Section 4: Terminology

4.1 Nuclear contamination threats

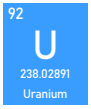
Alpha particles. Even though alpha particles are very energetic, they are so heavy that they use up their energy over short distances and are unable to travel very far from the atom. They may only emit radiation up to 2 inches from location, hence it is difficult for conventional technology to detect. They are the most harmful type of radiation due to the nature of the ionization, which can cause severe damage to cells and DNA if inhaled, ingested, or entered through a cut in the skin. They are easily stopped, but the most difficult to identify.

Beta particles. Beta particles move faster and emit further than Alpha particles. They penetrate further than Alpha but are less damaging due to the spacing of the ionization. They are most harmful when inhaled or ingested. They are easier to identify and relatively easy to stop.

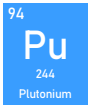
Gamma rays. Unlike Alpha and Beta particles with mass, Gamma Rays are weightless photons and are pure energy. They pass through the entire body causing damage to tissue and DNA. Existing technology can easily identify Gamma Rays. They are very difficult to stop and require dense material such as lead or thick concrete to stop.

4.2 Radionuclides

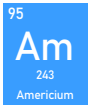
Additional detail describing each radionuclide is included below:



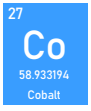
Uranium: Uranium is a chemical element with symbol U and atomic number 92. It is a silvery-grey metal in the actinide series of the periodic table. The most common isotopes in natural uranium are uranium-238 and uranium-235. It occurs naturally in low concentrations of a few parts per million in soil, rock, and water, and is commercially extracted from uranium-bearing minerals such as uraninite. Many contemporary uses of uranium exploit its unique nuclear properties, particularly in the nuclear energy generation sector. However, there is a range of use including military high-density penetrators and armor packages. As with the other actinides, uranium is radioactive and chemically toxic.



Plutonium: Plutonium is a radioactive chemical element with the symbol Pu and atomic number 94. It is an actinide metal of silvery-grey appearance that oxidizes when exposed to air and forms a dull coating when oxidized. Plutonium is the element with the highest atomic number to occur in nature. Trace quantities arise in natural uranium-238 deposits when uranium-238 captures neutrons emitted by decay of other uranium-238 atoms. Both plutonium-239 and plutonium-241 are fissile, meaning that they can sustain a nuclear chain reaction, leading to applications in nuclear weapons and nuclear reactors.



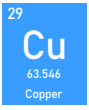
Americium: Americium is a synthetic radioactive chemical element with the symbol Am and atomic number 95. It is a relatively soft radioactive metal with silvery appearance and its most common isotopes are americium-241 and americium-243. It is widely used in commercial ionization chamber smoke detectors, as well as in neutron sources and industrial gauges.



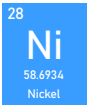
Cobalt: . Cobalt is a chemical element with the symbol Co and atomic number 27. As with nickel, cobalt is found in the Earth's crust only in a chemically combined form and once processed is a hard, lustrous, silver metal. Cobalt-60 is a radioisotope used as a radioactive tracer and to produce high-energy gamma rays for radiotherapy, sterilization of medical supplies as well as industrial radiography.

4.3 Primary Transition Metals

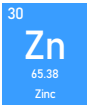
Codeac Liquid Solution also detects primary transition metals that may also be of interest to the user. These primary transition metals are Copper, Zinc, and Nickel. Codeac Liquid Solution detects these primary transition metals at levels that would be considered harmful in accordance with the U.S. Environmental Protection Agency (limits are listed in the **"Test Results and Color Standard Table".** Summary included below:



Copper: Copper is a chemical element with the symbol Cu and atomic number 29. It is a soft, malleable, and ductile metal with very high thermal and electrical conductivity. It is a reddish metal that occurs naturally in rock, soil, water, sediment, and air. Copper is a necessary micronutrient that is needed in trace amounts for good health but too much copper in a diet or drinking water may cause adverse health effects.



Nickel: Nickel is a chemical element with symbol Ni and atomic number 28. It is a silvery-white lustrous metal with a slight golden tinge. It is found naturally in the environment, but concentrations may be increased by human pollution such as nickel-plated faucets leaching into drain water, mining and smelting may dump nickel into wastewater catchments. Nickel metal is classified as a suspect carcinogen.



Zinc: Zinc is a chemical element with the symbol Zn and atomic number 30. Zinc is a slightly brittle metal at room temperature and has a shiny-greyish appearance when oxidation is removed. Zinc occurs in small amounts in almost all igneous rocks. In tap water, the zinc concentration can be much higher because of the leaching of zinc from piping and fittings. Acute toxicity arises from the ingestion of excessive amounts of zinc and may cause adverse health effects.

4.4 Measurements

Throughout this document, Codeac Solutions utilizes volumetric measurements for the purposes of colorimetric detection at trace level. This is to provide consistency of data across both liquid and solid tests as a chemical solution. Indicative conversions to other measurements can be provided upon request including becquerels, microcuries, and micrograms. There are several detailed assumptions behind these conversions and for more information, including further detail around becquerels per gram activities based on dry smears, please contact the Codeac Team in the **"Contact Details"** section.

The following provides further detail around the measurements / conversions used in the **"Test Results and Color Standard Table"** and when determining the minimum colour detection.

Measurement of particles per liquid concentration (g / liters) used were:

- **ppt –** parts per thousand
- **ppm –** parts per million
- **ppb –** parts per billion

Curies (emissions) – unit of radioactivity, corresponding to 3.7 × 10 disintegrations per second.

Becquerels (amount of decay) - the SI unit of radioactivity, corresponding to one disintegration per second.

4.4 Measurements (continued)

In the **"Test Results and Color Standard Table"** there are different limits referenced, these are further defined below:

- **Detection Limit, Smear:** Lower limit of visual color detectable for a specific element on a contact smear.
- **Detection Limit, Water:** Lower limit of visual color detectable for a specific element in water sample.
- **Environmental Background levels, Soil:** Detectable level of background (e.g. local soil, water) that will show a negative/positive color change for the environment of interest.
- **EPA limits in Water:** Hazard level limit for all substances (e.g. elemental, radionuclide, etc.) in surface or drinking water established by the Environmental Protection Agency (EPA) to protect human health and the environment.
- **EPA limits in Human:** Hazard level limit for all substances (e.g. elemental, radionuclide, etc.) established by the Environmental Protection Agency (EPA) to protect human health. These limits can be for internal or external contaminates.

Section 5: Legal Disclaimers (continued)

5.1 Use disclaimer

Field testing comes with an infinite number of variables which cannot be controlled by Codeac Solutions, Inc. Whilst we stand by our products, we assert the following:

- Results are not valid after 5 minutes from taking a sample.
- Use only as directed and for the intended use.
- Test Results are not guaranteed and or warranted by Codeac Solutions, Inc., and the color formed can vary with substance, amount, temperature, or other external factors.
- Both false positives and false negatives (as detailed in the **"Sampling and Testing Guidance" section**) are possible, these results should be confirmed by an expert.

The detection of specific radionuclides and primary transition metals involves multiple variables and factors when collecting and testing environmental material samples. Codeac Solutions, Inc. accepts no responsibility for any reliance upon the result from or use of a Test. The Test is a Go /No-Go Test and should not be used as the sole means of detection for specific radionuclides and primary transition metals and should be confirmed with other complementary radiological and nuclear detection instruments or specialist advice. The user is responsible for determining the suitability of this Product based on the intended use. All information provided in this **Operating Manual, Safety Data Sheet and Instruction and Colour Standard Card** should be carefully followed and the user should apply their own safety precautions and practices as well. Codeac Solutions, Inc. is not responsible for any inaccuracies in any Company documentation. This product has inherent limitations both in terms of accuracy and longevity. Any result should be confirmed using a confirmatory testing process with relevant experts. The burden of any consequences of a detection or lack of detection rests with the user.

Before relying on this Product in any important matter, users should carefully evaluate the accuracy, completeness, and relevance of the Product and the intended fitness for purpose for that use. If the user does not follow this **Operating Manual** and if the Product is not used correctly, it can prevent the Product from working properly and/or specific radionuclides and primary transition metals from being detected. It is imperative that radiological and nuclear contamination safety precautions, procedures and processes of the respective organization or the relevant authorities' guidelines and requirements are utilized during the collection and testing of all environmental material samples.

Section 5: Legal Disclaimers

5.2 Warranty disclaimer

CODEAC SOLUTIONS, INC. MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING WITHOUT LIMITATION ANY (a) WARRANTY OF MERCHANTABILITY; (b) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (c) WARRANTY REGARDING OR RELATING TO ANY DOCUMENTATION PRODUCED BY CODEAC SOLUTIONS, INC.; IN ANY SUCH CASE UNDER (a), (b) or (c), WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE, OR OTHERWISE.

IN NO EVENT SHALL CODEAC SOLUTIONS, INC. BE LIABLE FOR ANY DAMAGES WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, REGARDLESS OF WHETHER SUCH DAMAGES WERE FORESEEABLE AND WHETHER OR NOT EVALUATOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND NOTWITHSTANDING THE FAILURE OF ANY REMEDY OF ITS ESSENTIAL PURPOSE.

THE USER OF THIS PRODUCT ASSUMES ALL RISK AND LIABILITY CONNECTED WITH SUCH USE AND AGREES TO HOLD CODEAC SOLUTIONS, INC. HARMLESS. THIS PRODUCT SHOULD ONLY BE USED BY PERSONS WHO HAVE READ AND UNDERSTOOD THE FOLLOWING DOCUMENTS IN FULL; THIS **OPERATING MANUAL, SAFETY DATA SHEET, INSTRUCTION AND COLOR STANDARD CARD AND PRODUCT LABELS** AND HAVE A THOROUGH UNDERSTANDING OF ITS OPERATION AND RISKS.

Section 6: Contact information

Enquiries are always welcome. If you would like to discuss further the technical specifications, as well as any custom-made products your organization may need, please get in touch via the details below.

All enquiries and feedback can be directed to:

Codeac Solutions, INC.

contact@codeacsolutions.com

www.codeacsolutions.com

US:
980 N Michigan Avenue, Suite
1750 Chicago, IL 60611,
United States of America
(217) 656-5997

UK:
18-24 Turnham Green Terrace,
Chiswick, London W41QP,
United Kingdom
+44 7444 946 6287

codeac SOLUTIONS

APPENDIX

codeac SOLUTIONS

APPENDIX

Appendix A : Codeac Solution's Products Specifications and Summary

A.1 PRODUCT SUMMARY

Our one-of-a kind technology provides the capability to detect nuclear threats using a variety of applications. Our products include Single Use Ampules, Nuclear Detection Wipes, Water Tests and we have field kits tailored to your specific needs. Codeac Solutions' technology works across a range of environmental conditions and use cases—including rapid onsite alpha and beta particle detection in conditions where the use of other systems are impractical or infeasible.

OUR PRODUCT RANGE / TESTING CAPABILITIES

Nuclear Detection Wipe

WaterTest

Single Use Test

1oz/30 ml Bottle

OUR KIT TYPES

All product variations come in two kit options whether it be in the field or a lab. Each kits include all components required to complete the specified test onsite and provides results within 60 seconds:

NUCLEAR DETECTION KIT - FIELD

NUCLEAR DETECTION KIT

A.2 MULTI USE BOTTLE

Our multi-use bottle is available in two options: the field kit or a stand-up pouch. Each kit includes solution and dry wipes for a minimum of 16 tests with the contents listed below. For detailed instructions on utilizing this kit, **consult the Instruction and Color Standard Cards, as well as sections 1 to 6 of the Operating Manual**.

30 ML BOTTLE

The following items are included within your kit:

1 x 30 ml (1 oz) Multi-Use Bottle of Codeac Liquid Solution

4 x Pairs of Disposable Gloves

16 x Dry Surface Wipes and Test Results Bags

3 x Disposable Waste Bags

1 x Instruction and Color Standard Card

1 x Permanent Marker

1 x Molle Pouch and Patch or Stand-up Pouch

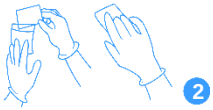
1 x Operating Manual (this document)

Assembly Instructions:

The detection kit with ruggedized pouch, has Modular Lightweight Load-carrying Equipment (MOLLE) attachments that enable secure attachment to personal equipment such as webbing, body armour and belts. For more information on fitting MOLLE attachments, please visit https://www.youtube.com/watch?v=Dln8YSL5jww&t=24s.

Simple And Easy-to-use Colorimetric Nuclear Detection

Wear appropriate PPE, as required by your organization.



Remove dry surface wipe and collect a sample is saturated to the edges.

Apply Codeac Liquid Solution to the dry surface wipe one drop at a time until the wipe is saturated to the edges.

Observe and wait up to 60 seconds for results. Use the Color Standard to identify any colorimetric change or transition. Confirm or report the results as required by your

TECHNICAL SPECIFICATION:

MULTI USE BOTTLE

Our versatile Detection Liquid Solution is available in 30ml/1 oz (minimum 16 tests) or larger sizes in bulk. A screw tap bottle with controlled drop dispersal combined with dry surface wipes for easy onsite detection.

Detection capability	Uranium, Plutonium, Americium, Cobalt and Primary Transition Metals
	U-233, U-234, U-235, U-236, U-238, Pu-239, Pu-239, Pu-241, Pu-242, Am-241, Am-243
Detection principle	Colorimetric elemental detection
Sensitivity	Uranium – 2.4ppm | Americium – 2.4ppm | Plutonium – 242ppm | Cobalt – 590ppb
Dimensions (approx.)	*Field pouch:* H18cm x W14cm x D6.5cm | *Stand-up pouch:* H30cm x W25cm X D12cm
Total kit Weight (approx.)	550 grams
Color Kit	*Field pouch*: Black, Olive Drab, Coyote Brown | *Stand-up pouch*: White
Amounts of tests	16
Response time	Under 1 minute
Contents	30ml (1 oz) Codeac Uranium, Plutonium or Americium Detection Solution 16 x dry surface wipes with sample identification bags 4x pairs of disposable gloves 3 x disposal waste bags 1x permanent marker 1x Instruction Card 1 x Color Standard Card 1x Molle Pouch (Black, Khaki or Coyote Brown) or a stand-up pouch
Available accessories	Replenishment kits available
Sample introduction	Liquid and solid
Transportability	Field ready
Calibration	Not required
Expiration	2 years
Power supply	Not required
Training required	Not required
Maintenance cost	Nil
Manuals available	Laminated Instruction Card, Color Standard Card, Safety Data Sheet and Operating Manual provided

Products are subject to availability. Company reserves the rights from time to time, in its sole discretion and without liability to change, add or withdraw Products.

A.3 SINGLE USE AMPULE TEST

Our single use ampule kit is available in two options: the field kit or a stand-up pouch. Each kit provides ampules and dry wipes for a minimum of 16 tests with the contents listed below. For detailed instructions on utilizing the kit, **consult the Instruction and Color Standard Cards, as well as sections 1 to 6 of the Operating Manual**.

SINGLE USE TEST

The following items are included within your kit:

16 x single use ampules with Codeac Liquid Solution

16 x Dry Surface Wipes and Test Results Bags

1 x Instruction and Color Standard Card

1 x Molle Pouch and Patch or Stand up Pouch

4 x Pairs of Disposable Gloves

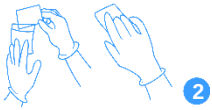
3 x Disposable Waste Bags

1 x Permanent Marker

1 x Operating Manual (this document)

Simple And Easy-to-use Colorimetric Nuclear Detection

Wear appropriate PPE, as required by your organization.



Remove dry surface wipe and collect a sample is saturated to the edges.

Apply Codeac Liquid Solution to the dry surface wipe one drop at a time until the wipe is saturated to the edges.

Observe and wait up to 60 seconds for results. Use the Color Standard to identify any colorimetric change or transition. Confirm or report the results as required by your

TECHNICAL SPECIFICATION:

SINGLE-USE AMPULES

Each of our single-use ampules contains enough of our detection liquid for one individual test. An ampule also comes with a dry surface wipe and a sample identification bag for easy onsite analysis that can be then transported back to the lab for further analysis.

Detection principle	Colormetric elemental detection
Sensitivity	Uranium – 2.4ppm | Americium – 2.4ppm | Plutonium – 242ppm | Cobalt – 590ppb
Dimensions	*Field pouch:* H18cm x W14cm x D6.5cm | *Stand-up pouch:* H30cm x W25cm X D12cm
Total Kit Weight (approx.)	500 grams
Color Kit	*Field pouch*: Black, Olive Drab, Coyote Brown | *Stand-up pouch*: White
Amounts of tests	16 tests – 16 ampules per kit
Response time	Under 1 minute
Contents	16x Single Use Ampules 16 x dry surface wipes with sample identification bags 4x pairs of disposable gloves 3 x disposal bags with result labels 1x permanent marker 1x instruction card 1x color standard card 1x Molle Pouch (Black, Khaki or Coyote Brown) or 1 x Stand-up pouch
Available accessories	Replenishment kits available
Sample introduction	Liquid and solid
Transportability	Pocket size, single-use
Calibration	Not required
Expiration	2 years
Power supply	Not required
Training required	Not required
Maintenance cost	Nil

Products are subject to availability. Company reserves the rights from time to time, in its sole discretion and without liability to change, add or withdraw Products.

A.4 WATER TEST KIT

Our water test kit includes five individually wrapped tests to conduct five separate onsite tests. For detailed instructions on utilizing this kit, **consult the Instruction and Color Standard Cards, as well as sections 1 to 6 of the Operating Manual.**

WATER TEST KIT

The following items are included within your kit:

5 x Water Test Kit bags (and disposable bag)

Each individual water test kit includes:

1 x Water Test Kit bag

1 x Beaker

1 x Syringe and **3** x filters

1 x Instruction and Color Standard Card

1 x Stand up Pouch

1 x Pair of Disposable Gloves

1 x Mixing tube

1 x single use ampule with Codeac Liquid Solution

1 x Operating Manual (this document)

1 x Permanent Marker

Simple And Easy-to-use Colorimetric Nuclear Detection

TECHNCIAL SPECIFICATION:

WATER TEST

Our water test allows the collection of liquid samples from various sources such as water bodies, puddles, taps, etc., enabling the onsite detection of contamination. Each test is equipped with a filtering method, making it possible to sample from even the most heavily soiled water sources.

Detection capability	Uranium, Plutonium, Americium, Cobalt and Primary Transition Metals
Sensitivity	Uranium – 2.4ppm | Americium – 2.4ppm | Plutonium – 242ppm | Cobalt – 590ppb
Detection principle	Colorimetric elemental detection
	e.g. U-233, U-234, U-235, U-236, U-238, Pu-239, Pu-239, Pu-241, Pu-242, Am-241, Am-243, Co-60
Dimensions	*Single Water Test Bag:* H21cm x W13cm x D4cm | *Stand-up pouch:* H30cm x W25cm X D12cm
Total Kit Weight (approx.)	366 grams
Color Kit	*Stand-up pouch:* White
Amounts of tests	5 tests – 1 ampule per test
Response time	Under 1 minute
Contents	5 x Single Use Water Test Kits including: 1 x beaker 1 x filter 1 x disposable glove bag 1 x mixing tube (with results label) 1 x single use ampule 1x permanent marker 1x instruction card 1x color standard card 1x Molle Pouch (Black, Khaki or Coyote Brown) or 1 x Stand up pouch
Available accessories	Replenishment kits available
Sample introduction	Water and Soil
Transportability	Pocket size
Calibration	Not required
Expiration	2 years
Power supply	Not required
Training required	Not required
Maintenance cost	Nil
Manuals provided	Instruction and Color Standard Card, Safety Data Sheet and Operating Manual

Products are subject to availability. Company reserves the rights from time to time, in its sole discretion and without liability to change, add or withdraw Products.

A.5 NUCLEAR DETECTION WIPES

Our nuclear detection wipes are available in two options: the field kit or a stand-up pouch. Each kit comes with 20 wipes with the contents listed below. For detailed instructions on utilizing the kit, **consult the Instruction and Color Standard Cards, as well as sections 1 to 6 of the Operating Manual**

DETECTION WIPE KIT

The following items are included within your kit:

20 x Nuclear Detection Wipes (in 2 x packs of 10)

5 x Test Results Bags

1 x Instruction and Color Standard Card

1 x Molle Pouch and Patch or Stand up Pouch

4 x Pairs of Disposable Gloves

3 x Disposable Waste Bags

1 x Permanent Marker

1 x Operating Manual (this document)

SIMPLE AND EASY-TO-USE COLORIMETRIC NUCLEAR DETECTION

1

Wear appropriate PPE, as required by your organization.

2

Tear Single-Use Nuclear Detection Wipe, remove the wipe and collect a sample from the area suspected of contamination

3

Allow 60 seconds for results and use the Color Standard to identify any colorimetric change or transition. A color change indicates a detection.

TECHNICAL SPECIFICATION:

NUCLEAR DETECTION WIPES

A convenient single-use individually wrapped detection wipe. The inner wipe is saturated with our detection liquid solution, enough for one test, with an outer foil tear protective sleeve. Available in custom sizes upon request.

Detection capability	Uranium, Plutonium, Americium, Cobalt and Primary Transition Metals
	e.g. U-233, U-234, U-235, U-236, U-238, Pu-239, Pu-239, Pu-241, Pu-242, Am-241, Am-243, Co-60
Detection principle	Colorimetric elemental detection
Sensitivity	Uranium – 2.4ppm | Americium – 2.4ppm | Plutonium – 242ppm | Cobalt – 590ppb
Dimensions	*Wet wipe:* 8.62cm x 7cm | *Field pouch:* W18.5cm x H11.5cm x 7cm | *Stand-up pouch:* H30cm x W25cm x D12cm
Total Kit Weight (approx.)	400 grams
Kit Color	*Field pouch*: Black, Olive Drab, Coyote Brown | *Stand-up pouch*: White
Amounts of tests	20 tests – 1 wipe per test
Response time	Under 1 minute
Contents	20x Nuclear Detection Wipes 4x pairs of disposable gloves 3 x disposal bags 5 x labels with result labels 1x permanent marker 1x instruction card 1x color standard card 1x Compact Pouch (Black, Khaki or Coyote Brown) or 1 x Stand-up Pouch
Available accessories	Replenishment kits available
Sample introduction	Liquid and solid
Transportability	Pocket size
Calibration	Not required
Expiration	2 years
Power supply	Not required
Training required	Not required
Maintenance cost	Nil
Manuals provided	Instruction and Colour Standard Card, Safety Data Sheet and Operating Manual

Products are subject to availability. Company reserves the rights from time to time, in its sole discretion and without liability to change, add or withdraw Products.

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