

Canadian Nuclear Society / Société Nucléaire Canadienne
CNS Geiger Kit Specification
Revision 0, 2012-07-06

1. Introduction

The CNS Geiger Kits have been developed in conjunction with the CNS Ionising Radiation Workshop. The kits are based on the RM-80 Geiger detector supplied by Aware Electronics. The Geiger interfaces to a personal computer, and a Windows® PC-compatible program AW-RADW.

The computer interface was originally configured for a classic serial port. While these are still available as a plug-in card (or a plug-in card/connector for some mother boards), conventional serial ports are no longer available on laptop or other compact case computers.

There have been several versions of interfaces that connect to a computer via a USB Port. The CNS has distributed kits with:

- An adapter for a classic serial port
- A USB serial port and “divide by two” adapter (not Windows® 7 compatible)
- Two versions of USB-MSP interfaces (both are Windows® 7 compatible).

This specification identifies:

- the components to be included in each CNS Geiger Kit
- recommended supplier for the components
- testing and reporting requirements
- labelling requirements
- packaging and shipping.

2. Components for each kit

Item	Quantity	Supplier	Model
Geiger Detector	1	Aware Electronics	RM-80 & cable
Computer interface & Cable	1	Aware Electronics	USB-MSP 2.5a, USB-micro USB cable
Interface Label	1	Staples Business Depot	Avery 5960 (7500 per pack)
Geiger Software	1	Aware Electronics	AW-RADW (8.0a)
5 kBq K ⁴⁰ -- KCl	1	Grocery store	NoSalt® canister 311 g
Zipper Freezer Bag	1	Grocery store	Glad Medium box of 20
Sample Containers	2	Fabri-Cal / A. Miracle Sanitation Supply Co. Inc.	PC550 5.5 oz Trans PS Portion Cup; XL345PC Clear PET Lid
150 Bq K ⁴⁰ (NoSalt®)	9 mL	From extra NoSalt® can.	In sample container above
Bentonite clay sample	1 ~ 20 mL	Grocery store	Low-cost clumping cat litter

Item	Quantity	Supplier	Model
			In sample container above
Small Bulldog Clip	1	iBuyOfficeSupply.ca	Sparco SPR58500 (box of 36)
Nylon fishing line	1.5 m	Canadian Tire	Northern Sport 25 lb 46 m
Magnet holder	1	Walmart	Super magnets TY-WM10-SM (10 per card)
		iBuyOfficeSupply	QRT 59931 20 per package
Microfibre Towel 35 x 35 cm	1	Canadian Tire	Simoniz package of 25 or 8 or equivalent
9" Helium Quality Balloons	2	Giant Tiger	Unique package of 25
Burnable CD	1	As available	
CD Label	1	Staples Business Depot	Avery 08692 (40 per pack)
		iBuyOfficeSupply	Avery 06692 (30 per pack)
CD jewel case	1	As available	
Circular Labels	4	Staples Business Depot	Avery 08293 (400 per pack)
		iBuyOfficeSupply	Avery 08293 (400 per pack)
Geiger Kit Case	1	Standa Importing	EraSeal 141 oz container
Rectangular labels for USB-MSP interfaces	1	Staples or as available	Avery 5960 (address label), 30 per sheet

Notes:

1. The RM-80 provides sufficiently high sensitivity to alpha, beta, and gamma to produce numbers of counts with useful statistical properties in counting time durations that are practical for classroom use.
2. The current USB-MSP interfaces provide superior performance at high count rates.
3. The USB-MSP interface is to be fitted on the bottom side with a **trimmed label** on the bottom side.
4. The ***new CNS version*** of the Aware Electronics software includes a "normal" Windows® installation process, and a customized start-up script that configures the CNS preferences for defaults.
5. A canister of NoSalt® may be obtained in most grocery stores for ~ \$6. It is supplied "unopened".
6. A zipping plastic bag is recommended for the NoSalt® canister to avoid accidental contamination of the Geiger with KCl.
7. The small sampler containers listed are available as "samples" or in large numbers. Alternative containers may be found that support the Geiger with its window bezel protruding into the container.

8. One 9 mL sample of NoSalt® ~ 150 Bq K⁴⁰ is provided in one of the sample containers. This corresponds to the daily ingestion and excretion of potassium. The NoSalt® is supplied from a separate container.
9. 20 mL of bentonite clay in the form of low-cost clumping cat litter is provided in one of the sample containers as a useful source, primarily K⁴⁰.
10. A metal miniature bulldog clip (with straight jaws) is used to seal and grip the stem of the inflated balloon.
11. Nylon (not monofilament) fishing line is used to suspend the bulldog clip from the magnet holder.
12. The magnet holders are sold by Walmart and Staples Business Depot as analogues to “push pins” for use with filing cabinets or other metal surfaces. The fishing line may be secured to the handle end of the magnet holder. (Staples have reduced the number of these per card.)
13. Microfibre cloth is used to develop an electrostatic charge on the inflated balloon as an analogue to cat fur. An intense charge provides the best results, and these cloths have been found to perform well.
14. The balloons may be used more than once, although the probability of failure is sufficiently high that having only one on hand is not a good idea. Please stretch the balloon prior to inflating.
15. The software is distributed with CNS documentation on a burnable CD. A circular adhesive label identifies the CD.
16. A jewel case is preferred for the distribution of software. This reduces the risk of damage, and the presence of the open case reminds the user that the CD may still be in the drive.
17. Circular labels are required for the sample containers and the Geiger window cover.
18. The plastic EraSeal 4000 mL container packages the kit components.

3. Geiger Kit Hot Balloon Supplement

Hot Balloon Supplement Kits are provided to teachers who request one. These consist of the Small Bulldog Clip, Nylon fishing line, Magnet holder, Microfibre Towel 35 x 35 cm, 9” Helium Quality Balloons (2), packaged in a Glad Medium Freezer Bag, and labeled with an Avery 5960 label.

Item	Quantity	Supplier	Model
Small Bulldog Clip	1	iBuyOfficeSupply.ca	Sparco SPR58500 (box of 36)
Nylon fishing line	1.5 m	Canadian Tire	Northern Sport 25 lb 46 m
Magnet holder	1	Walmart	Super magnets TY-WM10-SM (10 per card)
		iBuyOfficeSupply	QRT 59931 20 per package
Microfibre Towel 35 x 35 cm	1	Canadian Tire	Simoniz package of 25 or 8 or equivalent
9” Helium Quality	2	Giant Tiger	Unique package of 25

Item	Quantity	Supplier	Model
Balloons			
Glad Medium Freezer Bag	1	As available	
Hot Balloon Supplement label	1	As available	Avery 5960 label, 30 per sheet

4. Testing

On receipt, all of the Geigers in the order shall be tested with a check source to confirm operation.

Testing of the USB-MSP interfaces is desired, **however we are awaiting the manufacturer providing a simple, reliable testing procedure** (driver saturates COM port numbers unless these are changed manually each time).

Testing of the USB cables is required pending improved experience. Several “short cables” had defective micro-USB connectors in 2011.

5. Reporting

Written test reports shall confirm the serial numbers of the components tested, the test status, date tested, and results.