



Canadian Radon Initiatives and Comparison of Consumer-Grade Electronic Radon Monitors



Canadian Radon Initiatives - measurement

- Measure radon in Bq/m^3 ($37 \text{ Bq/m}^3 = 1\text{pCi/L}$)
- Measure radon for using a long-term; 91 days or more
- Primary testing with alphatracks or eperms



Canadian Radon Initiatives - measurement

- Canadian Guideline Level is 200 Bq/m^3
- We have a Real Estate Assessment process for shorter term screening, 4 days or more and must be followed up with a long-term radon test



Canadian Radon Initiatives – Mitigation

- Mitigation can be done out the sidewall of the house and fan can be inside
- Mitigation involves proper pressure testing and fan sizing
- Certified professionals across Canada
- Typical mitigation systems installed by certified professionals reduce radon levels to below 50 Bq/m^3 (1.35 pCi/L)



Canadian Radon Initiatives – Mitigation

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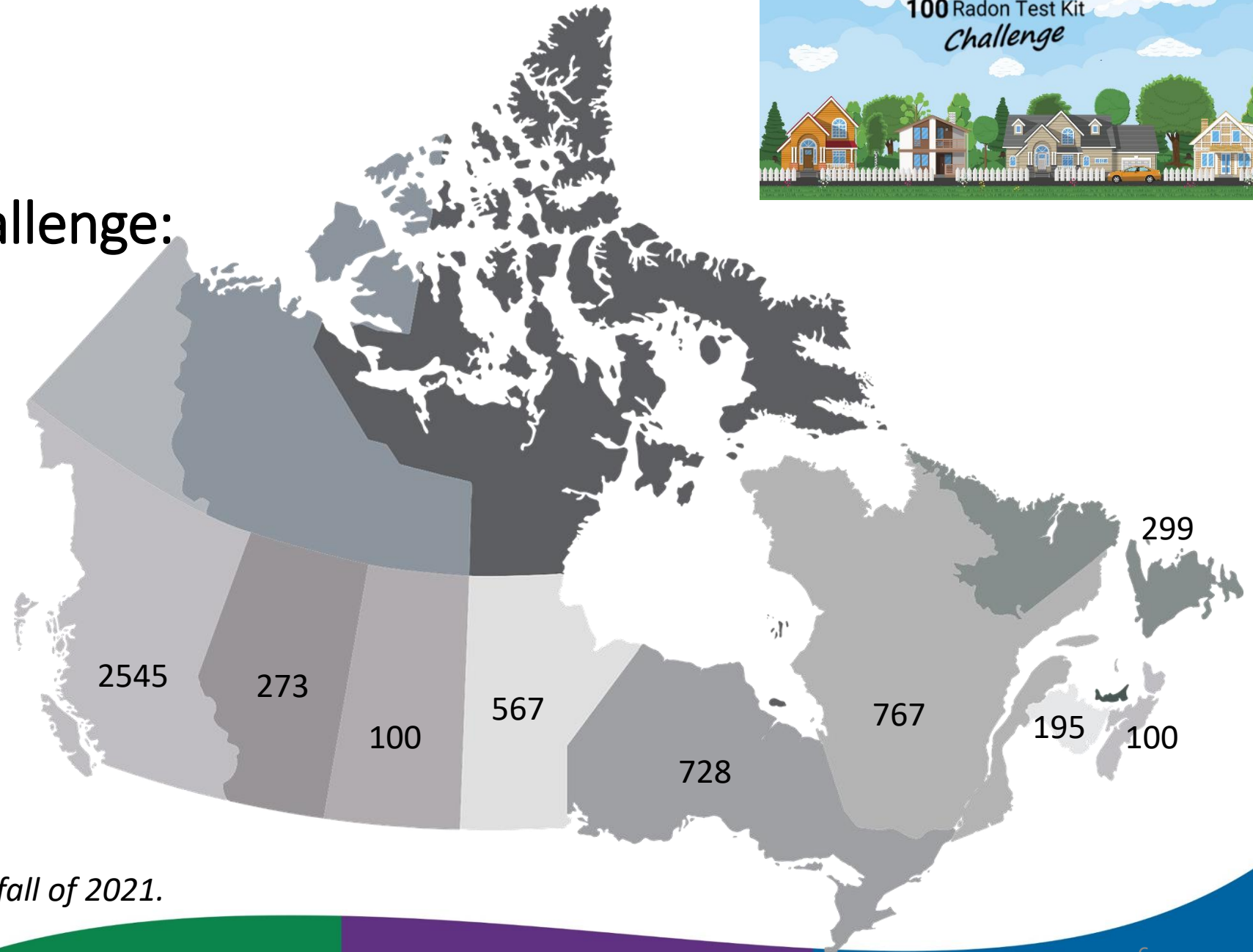


100 Radon Test Kit Challenge: Impact to date

3 years

40 communities

*Over 5 500 kits
distributed*



Finalizing the list of communities for fall of 2021.



Radon Reduction Sweepstakes – 2021/2022

2 prizes of \$500 per region (8 regions across Canada)

Anyone who has reduced their radon using a C-NPRP professional can apply.

Winners from the 2020/2021 will be announced in October.

<https://takeactiononradon.ca/radon-reduction-sweepstakes/>



TAKE
ACTION 
ON **RADON** 

RESOURCES:

TAKE ACTION ON RADON

Radon is an invisible, radioactive gas that comes from the ground

Radon is the **2ND LEADING CAUSE** of **LUNG CANCER**

3000+ PEOPLE/YEAR die from radon-induced **LUNG CANCER**

Radon is in **ALL** buildings

The only way to know how much radon is in your home is to **TEST**

Radon is easy to **TEST** and easy to **REDUCE**

HOW TO REDUCE RADON IN YOUR HOME

- HIRING** a certified professional **LOWERS RADON BY UP TO 90%**
- INCREASING** home ventilation **LOWERS RADON BY 25-50%**
- SEALING** cracks **LOWERS RADON BY 13%**

Recent research found that **ONLY 29% OF CANADIANS** with high RADON in their home took action to **REDUCE** it!

TEST and REDUCE RADON to protect against lung cancer

www.takeactiononradon.ca

RADON IS THE LEADING CAUSE OF LUNG CANCER IN NON-SMOKERS

Test your home for radon and reduce your risk.

Testing is easy. Purchase a test at: takeactiononradon.ca/test/radon-test-kits/

Place a test in your house for 91 days.

After 91 days, return the test to the lab and get your results.

TAKE ACTION ON RADON

www.takeactiononradon.ca

#TAKEACTIONONRADON @ACTIONONRADON #RADONACTIONMONTH

Window Clings available

TESTED FOR RADON

www.TakeActionOnRadon.ca

RADON MESURÉ

www.OccupeToiDuRadon.ca

Pins

I'VE TESTED FOR RADON

LE RADON C'EST MESURÉ

RADON IS THE LEADING CAUSE OF LUNG CANCER IN NON-SMOKERS

PROTECTING YOUR HEALTH IS AS EASY AS...

1. Test
2. Assess
3. Take Action

TAKE ACTION ON RADON

TO FIND OUT WHERE YOU CAN BUY RADON TEST KITS OR TO FIND A C-NRPP-CERTIFIED RADON PROFESSIONAL IN YOUR REGION, GO TO: www.takeactiononradon.ca

#TakeActionOnRadon @ActionOnRadon #RadonActionMonth

Postcard (French on reverse)

We also have playing cards available for purchase.

Order online:

<https://form.jotform.com/91975565858277>

TAKE ACTION ON RADON

- Radon causes lung cancer.
- Reduce the risk.
- Test your home.

OCCUPE TOI DU RADON

- Le radon cause le cancer du poumon.
- Réduisez les risques.
- Testez votre maison.

www.TakeActionOnRadon.ca

#TakeActionOnRadon @ActionOnRadon



Multiple Languages

Bookmarks and postcards in Tagalog, Punjabi, Italian and Chinese!

We are also working with some communities to translate into some First Nation Languages.

ਸ਼ਿਗਰਤ ਨਾ ਪੀਣ ਵਾਲਿਆਂ ਵੱਲੋਂ ਫੋਫੜਿਆਂ ਦੇ ਕੈਂਸਰ ਦਾ ਪ੍ਰਮੁੱਖ ਕਾਰਨ ਰੋਡਨ ਹੁੰਦਾ ਹੈ।
 ਆਪਣੀ ਸ਼ਿਗਰਤ ਦੀ ਰੱਖਿਆ ਕਰਨਾ ਇੰਨਾ ਸੌਖਾ ਹੈ...

1. ਟੈਸਟ ਕਰੋ
2. ਨਤੀਜਾ ਵੇਖੋ
3. ਕਾਰਵਾਈ ਕਰੋ

ਇਹ ਪੜਾ ਲਗਾਉਣ ਲਈ ਕੀ ਰੋਡਨ ਟੈਸਟ ਕੌਂਟਾਂ ਕੌਥਿ ਖਰੀਦੀਆਂ ਜਾ ਸਕਦੀਆਂ ਹਨ ਜਾਂ ਆਪਣੇ ਇਲਾਕੇ ਵੱਲੋਂ ਇਕ C-NRPP ਪ੍ਰਮਾਣਿਤ ਰੋਡਨ ਪੇਸ਼ੇਵਰ ਲੱਭਣ ਲਈ, ਇਥੇ ਜਾਓ।
www.TakeActionOnRadon.ca

RADON ANG NANGUNGUNANG DAMLAN NO CANCER SA BAGA PARA SA MGA TAGONG HINDI NANGHISARILYO.

Sudin kung may radon ang inyong tahanan at bawasan ang panganib sa masamang epekto nito.

Madalì lang ang pagsusuri. Bumili sa: takeactionradon.ca/test/radon-test-kits/

Maglagay ng pansuri sa inyong tahanan sa loob ng 91 araw.

Paglitas ng 91 araw, ibalik ang pansuri sa lab at kunin ang inyong mga resulta.

Umaksyon sa Radon
www.TakeActionOnRadon.ca

ਸ਼ਿਗਰਤ ਨਾ ਪੀਣ ਵਾਲਿਆਂ ਵੱਲੋਂ ਫੋਫੜਿਆਂ ਦੇ ਕੈਂਸਰ ਦਾ ਪ੍ਰਮੁੱਖ ਕਾਰਨ ਰੋਡਨ ਹੁੰਦਾ ਹੈ।
 ਆਪਣੇ ਘਰ ਦੇ ਵੱਲੋਂ ਰੋਡਨ ਹੋਣ ਦੀ ਜਾਂਚ ਕਰੋ ਅਤੇ ਆਪਣੇ ਜੋਖਮ ਨੂੰ ਘਟਾਓ।

ਟੈਸਟ ਕਰਨਾ ਸੌਖਾ ਹੈ। ਇਕ ਟੈਸਟ ਕਿੱਟ ਖਰੀਦੋ: takeactionradon.ca/test/radon-test-kits/

ਟੈਸਟ ਕਿੱਟ ਨੂੰ ਆਪਣੇ ਘਰ ਵਿੱਚ 91 ਦਿਨਾਂ ਲਈ ਰੱਖੋ।

91 ਦਿਨਾਂ ਤੋਂ ਬਾਅਦ, ਟੈਸਟ ਕਿੱਟ ਟੈਸਟ ਕਰੋ ਤੁਹਾਨੂੰ ਫੋਕਸ ਕਰੋ ਅਤੇ ਆਪਣੇ ਨਤੀਜੇ ਪ੍ਰਦਾਸ ਕਰੋ।

ਰੋਡਨ ਦਾ ਖਾਤਮਾ ਕਰਨਾ
www.TakeActionOnRadon.ca

氡是导致非吸烟者患上肺癌的主要原因
 在家中检测氡含量，降低您的风险。

检测很容易检测盒购买链接：
takeactionradon.ca/test/radon-test-kits/

将检测盒置于家中91天

91天后，将检测盒送回实验室并获取检测结果。

对氡采取行动
www.TakeActionOnRadon.ca





Free Downloadable Resources:
Radon photos now available on
pixabay.com



POPULAR LATEST ABOUT ME





Take Action on Radon has:

- Presented a webinar to CCS's SHL and CIL on the risks of radon exposure, specifically when coupled with smoking.
- Developed resources for both team to use with clients and partners in order to answer questions on radon and provided the necessary information about testing for radon, reducing exposure, and spreading awareness.

REDUCE YOUR CHANCES OF A LUNG CANCER DIAGNOSIS

Lung cancer is the most commonly diagnosed cancer in Canada. It is the leading cause of death from cancer for both men and women in Canada.¹

Smokers have the highest risk of getting lung cancer and radon increases that risk. There are other factors that also increase lung cancer risk such as outdoor air pollution, physical inactivity and poor nutrition, specifically with a lack of fruit and vegetable consumption. While you should consider improving all these risk factors, the combination of radon and smoking is particularly dangerous.



RADON + SMOKING = DANGEROUS COMBINATION

QUIT OR REDUCE TOBACCO
Tobacco use is the #1 preventable risk factor in getting lung cancer

WHAT CAN YOU DO?

TEST AND REDUCE RADON
After tobacco, radon is the leading cause of lung cancer.

STEPS TO QUIT SMOKING

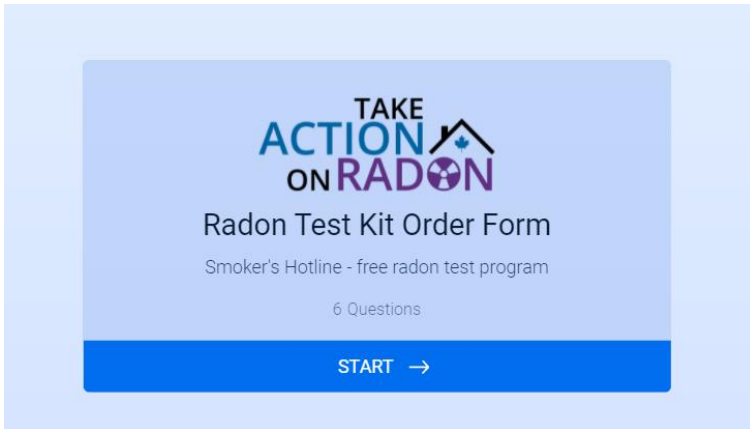
- 1 Make a quit plan.
- 2 Get guidance from a Quit Coach:
 - Call 1-866-366-3667
 - Text 'iQuit' to 123456
 - Chat go to smokershelpline.ca
- 3 Investigate Quit aids with a health professional
- 4 Select a quit date
- 5 Inform family and friends
- 6 Think about situations that you connect with smoking such as drinking coffee, driving, or having alcohol and come up with temporary alternatives such as replacing coffee with juice, foregoing alcohol for a little while, etc.

STEPS TO TAKE ACTION ON RADON:

- 1 TEST for Radon
- 2 EVALUATE Radon levels (Guideline is 200 Bq/m³)
- 3 DETERMINE necessary actions and timeline
- 4 REDUCE - find a mitigation professional
- 5 SPREAD RADON AWARENESS - Tell Others
To learn more go to takeactiononradon.ca



Canadian Cancer Society: Smoker's Helpline and Cancer Information Line



Take Action on Radon is offering FREE radon tests for any client who calls the **Smoker's Helpline or Cancer Information Line.**



Canadian Cancer Society / Société canadienne du cancer





White Ribbon Campaign



Free tests for Lung Cancer Patients and Families

- Piloted project with BC Cancer Agency
- Also working with Canadian Cancer Society's Cancer Information and Prevention Specialists
- Includes a CARE PACKAGE



Canadian
Cancer
Society

Société
canadienne
du cancer



CAREX
CANADA




Comparison of Consumer-Grade Electronic Radon Monitors

Journal of Radiological Protection

PAPER • OPEN ACCESS

A comparison of consumer-grade electronic radon monitors

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Digital Radon Monitors





Digital Radon Monitors

Manufacturer's Name	Device Name	Radon Sampling Method	Detection Method
Airthings AS	2900 Wave	Passive diffusion chamber	Alpha spectrometry
Airthings	Wave Plus	Passive diffusion chamber	Alpha spectrometry
Corentium	Home	Passive diffusion chamber	Alpha spectrometry
Safety Siren (Year 1)	Pro Series 3		Ionization Chamber
Safety Siren (Year 2)	Pro Series 4		Ionization Chamber
Radon Eye	Radon Eye Plus		Pulsed ion chamber
Radon Eye	Radon Eye RD200		pulsed ion chamber
Air Steward (year 2)	Air Steward	Uncertain	uncertain



Radiation Safety Institute of Canada's radon chamber, Saskatoon, SK



Digital Radon Monitors



Methodology is based on Public Health England's Intercomparison of Passive Radon Detectors

Accuracy – Relative Percent Error between the average radon monitor radon concentration and radon chamber reference radon gas concentration

$$\text{Relative Percent Error (\%)} = \frac{(\text{Measured Mean} - \text{Reference Value})}{\text{Reference Value}} \times 100\%$$

Precision – Relative Standard Deviation for the results measured for each model of individual radon monitor tested

$$\text{Relative Standard Deviation (\%)} = \frac{\text{Standard Deviation}}{\text{Measured Mean}} \times 100\%$$



Digital Radon Monitors



Measurement Error

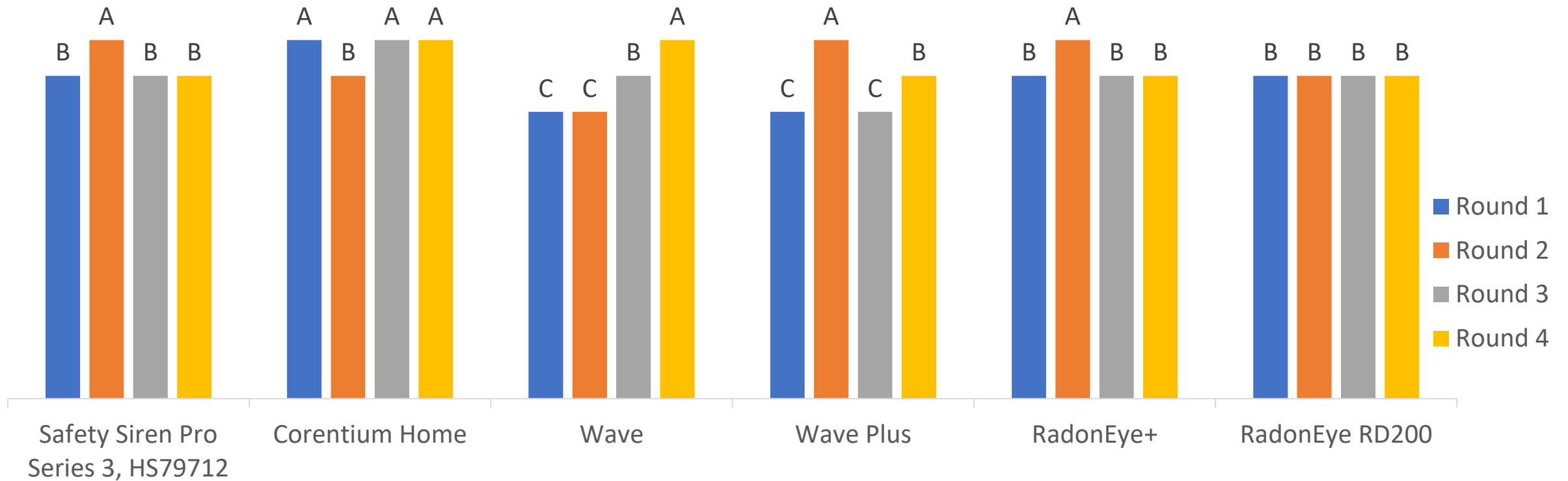
Measurement Error (%)

$$= \sqrt{(\text{Relative Percent Error})^2 + (\text{Relative Standard Deviation})^2}$$

Measurement Error (%)	Performance Grade
≤ 10	A
> 10 and ≤ 20	B
> 20 and ≤ 30	C
> 30 and ≤ 40	D
> 40	E

Year 1: Grade Summary

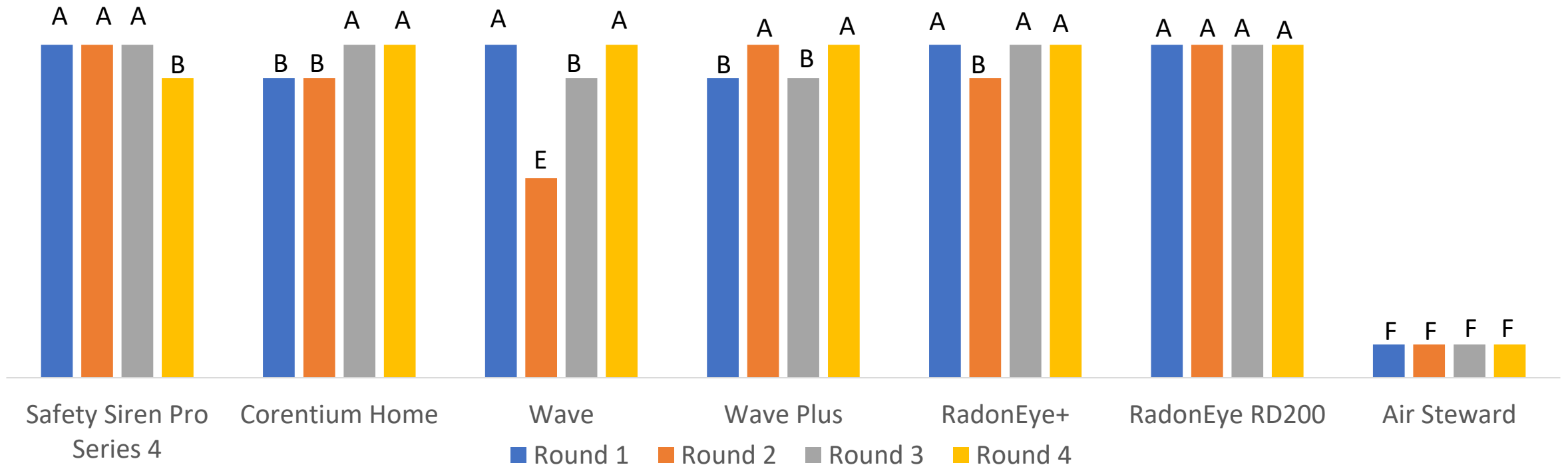
Cummulative Grades on Devices



Grouped by Test devices on different Test Condition

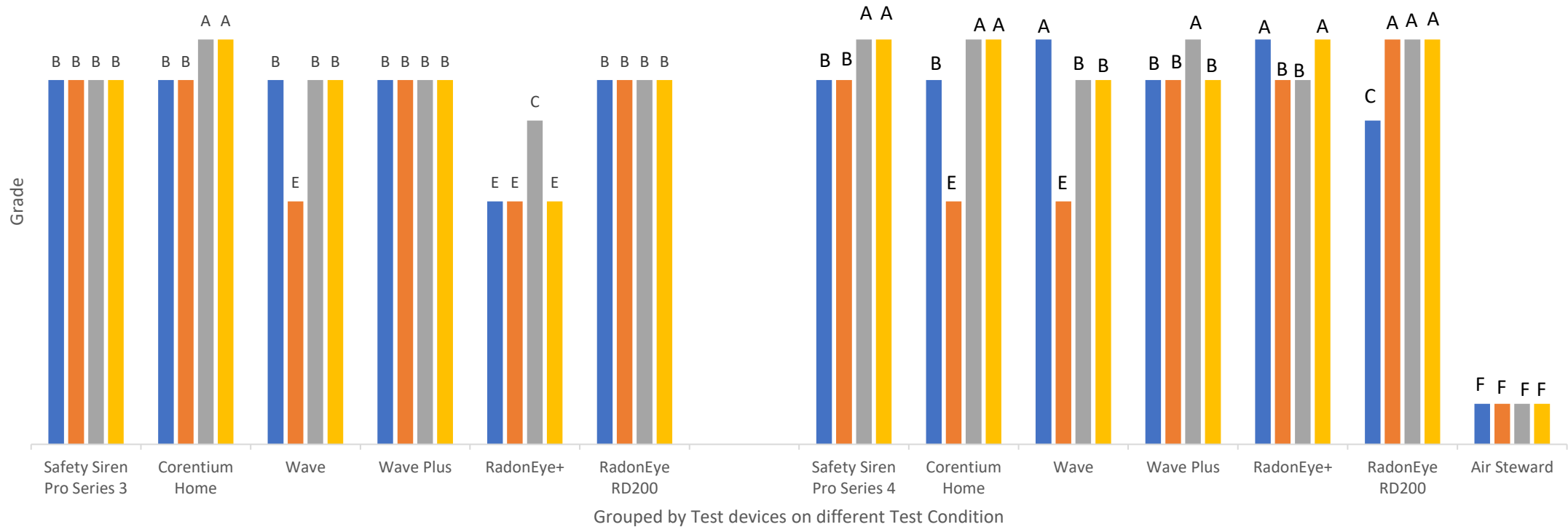
Year 2 – Grade Summary

Cumulative Grades on Devices



Year 3 – Grade Summary

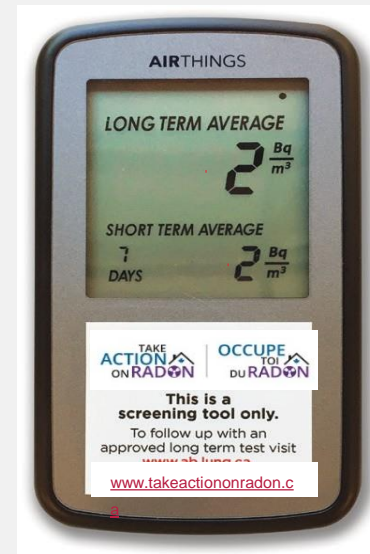
Cummulative Grades on Devices



Year 1 Devices - repeated

Year 2 Devices - repeated

Library Loan Programs



Annual Monitor Check – Two Methods

Method 1: Compare digital detector versus a professional level Continuous Radon Monitor (CRM) side by side, 10 cm (4”) apart for 8-10 days. Use Method 1 when you have 4 or less monitors.

Method 2: If you do not have access to a CRM, calculate the Average Long-Term (ALT) radon level of all the monitors. **You must have a minimum of five monitors to use the ALT method, monitors must be spaced 10 cm apart for 8-10 days.**



Annual Monitor Check – Calculations:

Method 1: (check each monitor vs. the professional level CRM) acceptable level
($>100 \text{ Bq/m}^3$) calculate the difference between each monitor and the

If the radon level on the CRM is below 100 Bq/m^3 CRM)

Then the difference between the radon level on the CRM and the individual
monitor should be within 25 Bq/m^3 . calculate the Average Long-term (ALT)

(above 100 Bq/m^3) and, monitors must be spaced 10 cm apart. To find the

If the radon level on the CRM is above 100 Bq/m^3 term levels and divide by the

Then the difference between the radon level on the CRM and the individual
monitor should be within 20% of the radon level from the CRM. sheet includes

$$\frac{|\text{Radon level from CRM} - \text{Long Term Radon Level From Individual Monitor}|}{\text{Radon Level from CRM}}$$



Annual Monitor Check – Calculations:

Method 2: (average the levels from the monitors vs. the professional level CRM) (table level
($>100 \text{ Bq/m}^3$) calculate the difference between each monitor and the

If the radon level on the CRM is below 100 Bq/m^3

Then the difference between the radon level on the CRM and the individual monitors
should be within 25 Bq/m^3 . Contact the manufacturer about any monitor which is more
then 25 Bq/m^3 different.

(above 100 Bq/m^3)

If the radon level on the CRM is above 100 Bq/m^3

Then the difference between the radon level on the CRM and the average radon level of all
the monitors (Average Long-Term (ALT)) should be within 20% of the radon level from the
CRM.

$$\frac{| \text{Radon level from CRM} - \text{Average Long - Term (ALT)} |}{\text{Radon Level from CRM}}$$



Thank you....Questions?

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