

Measuring Radon Levels from Concrete

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www.WPB-Radon.com

High-sensitivity, small Radon Monitors can measure Flux



Mortite
putty
works
better than
gaskets



Place Radon Monitors in a
Metal bucket that is
absolutely air-tight.

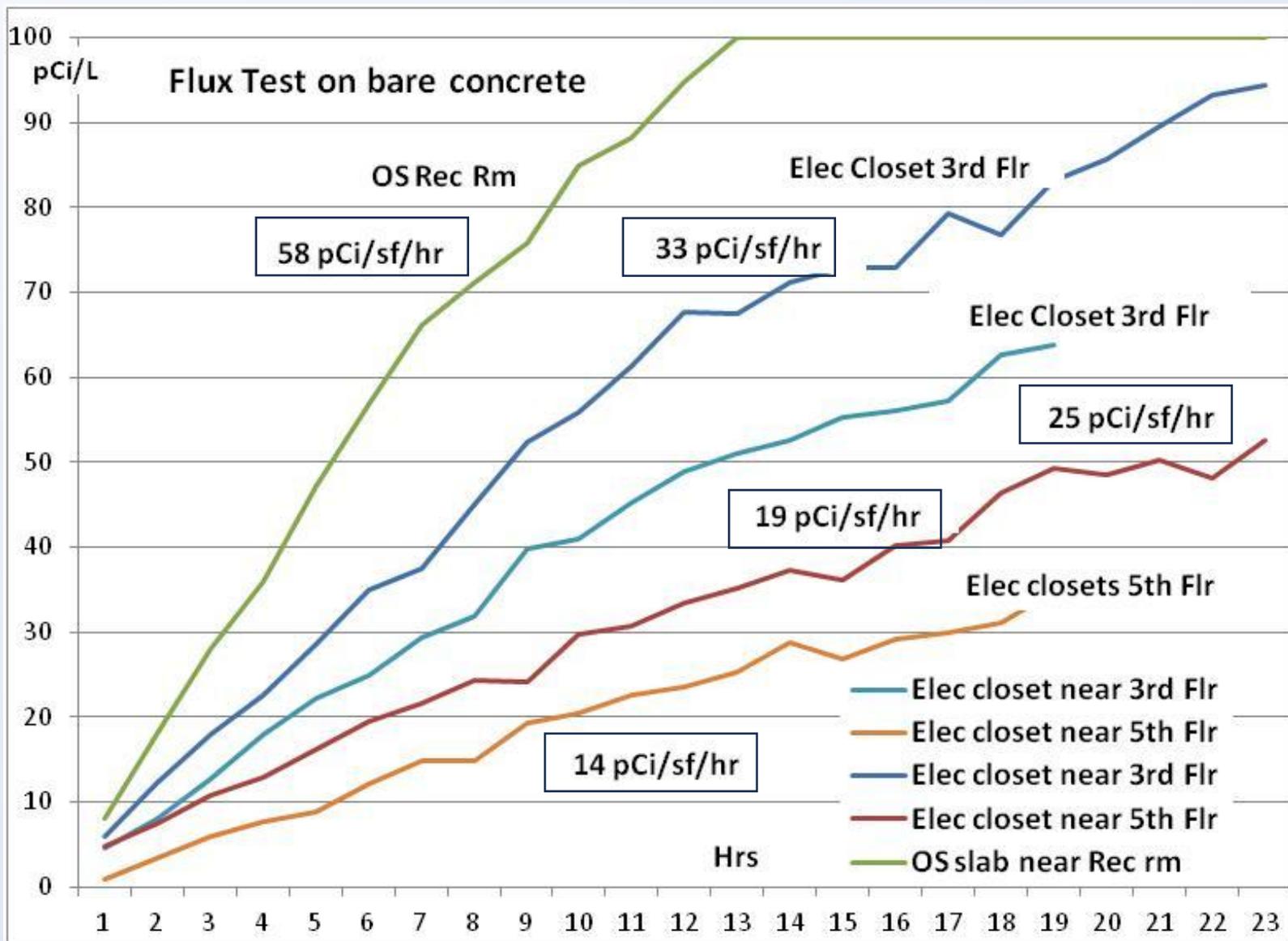
Larger Slab Area & Less Volume
equals Greater Sensitivity

EcoQube
or
AranetRN

with a 3 Liter bowl
are easiest to use

Florida flux measurements need 4 to 8 hours of exposure

Ingrowth greater than **10 pCi/sf/hr** is needed to cause significant indoor radon in **very low ACH**



33 pCi/sf/hr Flux changed 7 to 27 pCi/L (20) over 4 hours

14 pCi/sf/hr Flux changed 2 to 18 pCi/L (16) over 8 hours

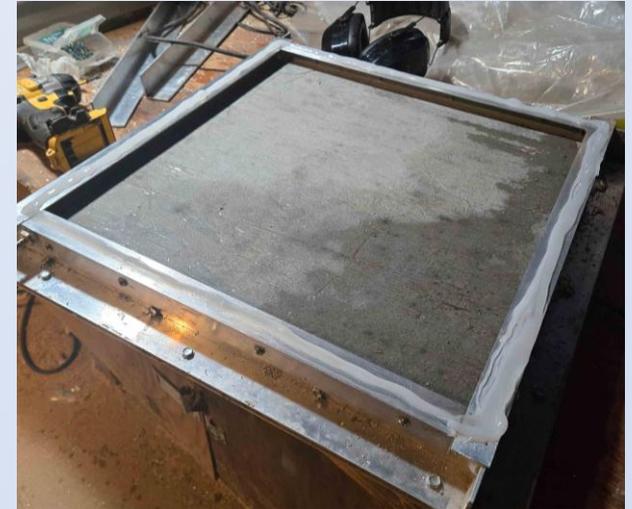
A concrete slab was constructed with a sealed chamber under it.
An airflow of 1 LPM of 1350 pCi/L of radon provided the slab flux



Aluminum frame
box with $\frac{3}{4}$ "
plywood to create
an air space



After the Concrete
set, the $\frac{3}{4}$ " plywood
was removed
from the bottom



The $\frac{3}{4}$ " space was covered
with galvanized sheet metal.
Inlet and outlet ports
were installed

Radon flux was reasonably consistent



1350 pCi/L
flow
under the
slab



Consistent Flux of about 23 pCi/SqFt/Hour out of the slab

Radon Monitor inside a Flux Bucket



Twist three strands of
Mortite into a rope.
Hand compress onto edge
Leave space for Elec cord
and compressed air



Compress Mortite
to obtain
a perfect seal



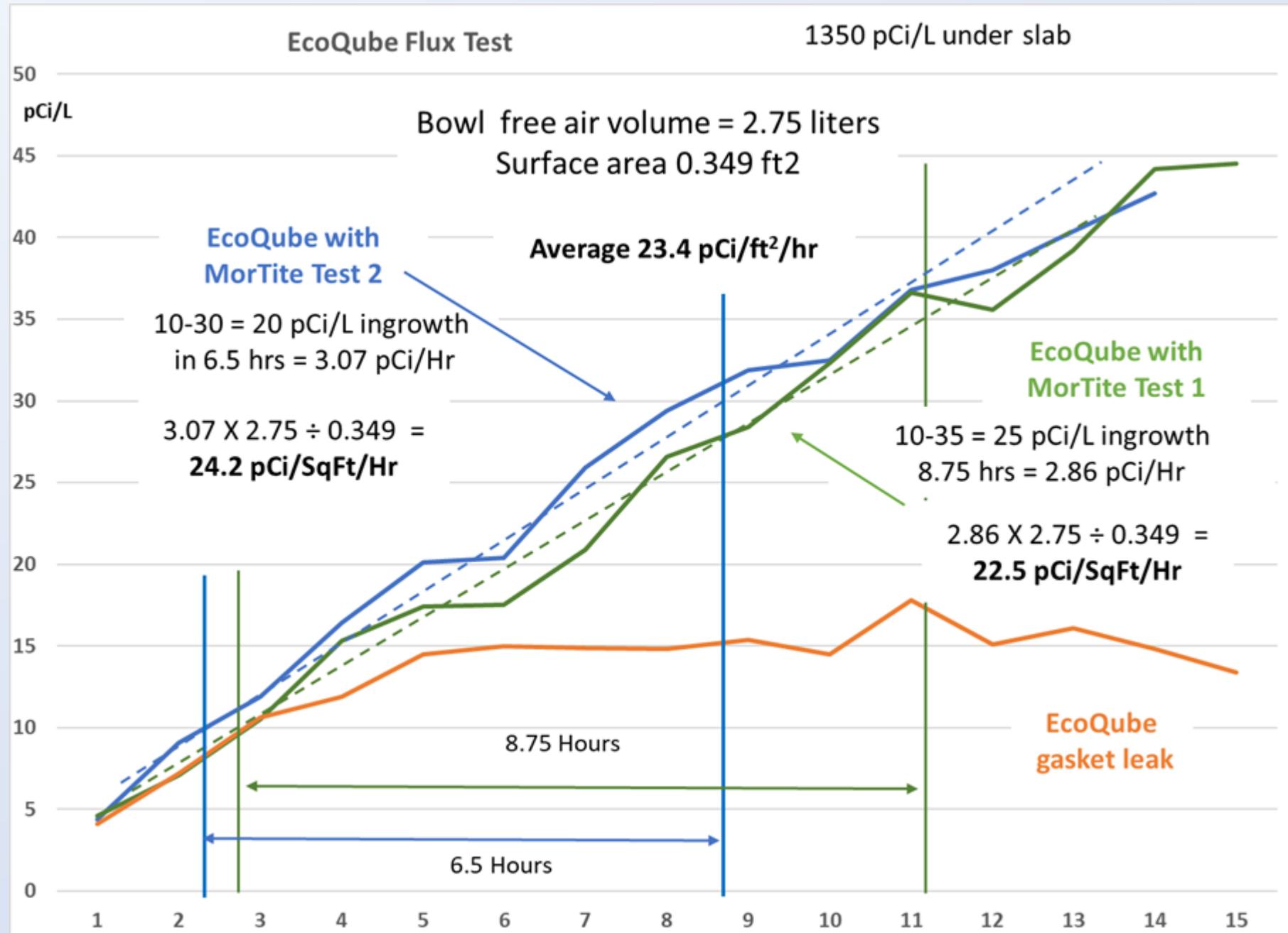
Use extra Mortite for
sealing around
the opening and cord

EcoQube
 2 Flux Test avg
 23.4 pCi/SF/Hr

Sealing the edge
 is critical

Change in Radon
 ÷ Hours
 X Volume
 ÷ by slab area
 = pCi/ft²/Hr

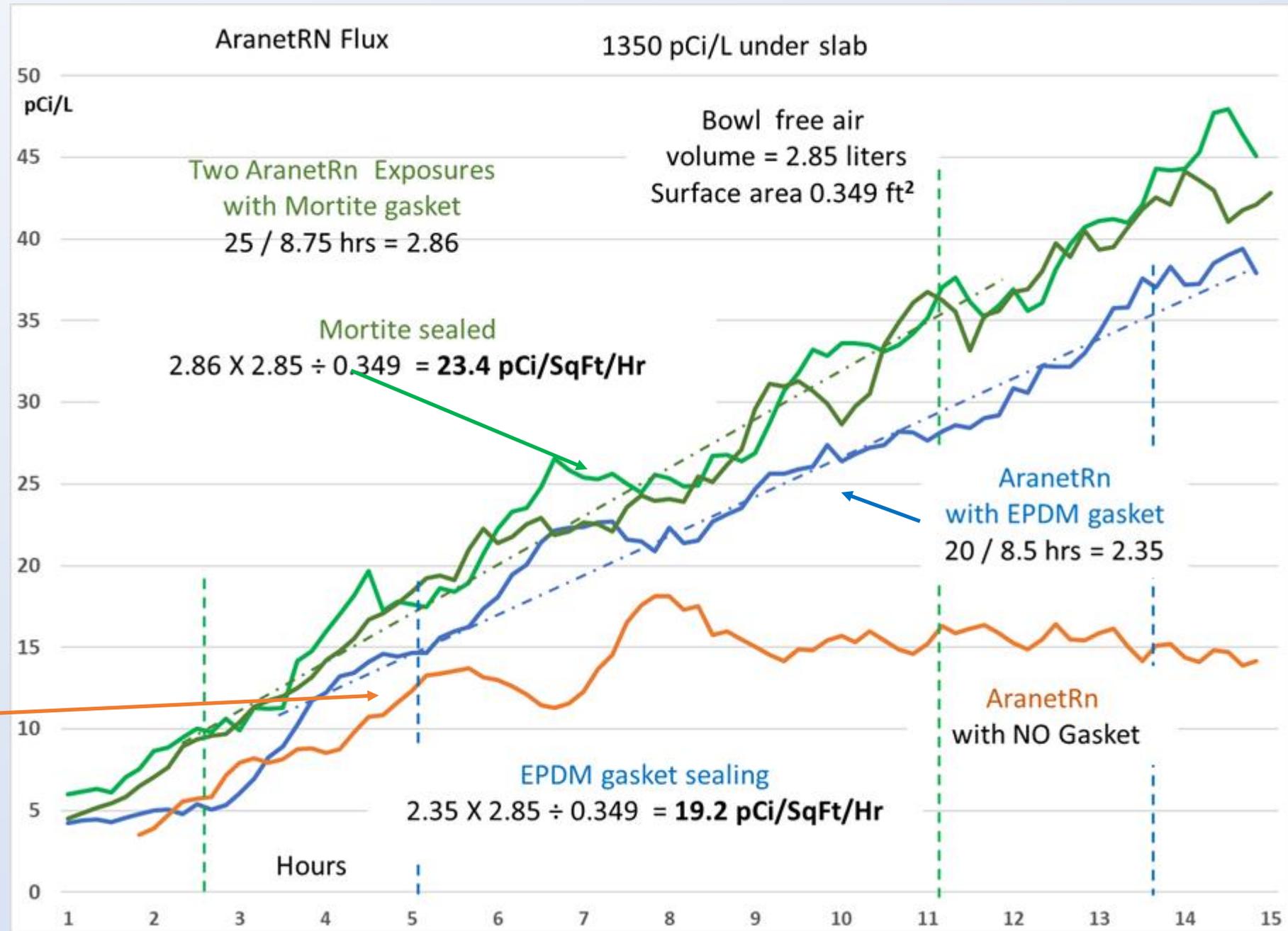
7% difference



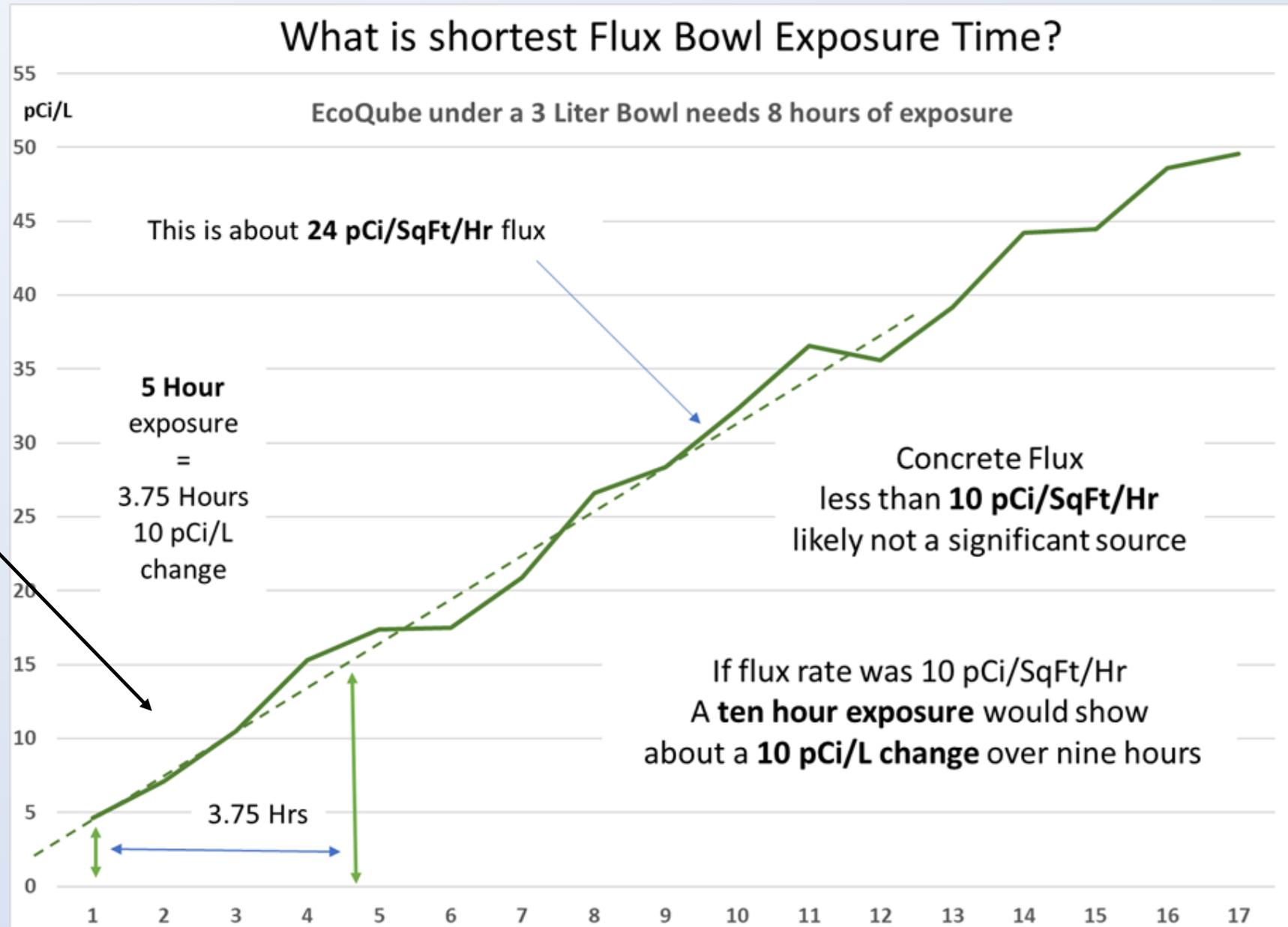
AranetRn Flux Test average 23.4 pCi/SF/Hr

Mortite gave
best sealing

Note that the
unsealed bowl
flattens out
after 3 hours



If Flux is greater than 20 pCi/sf/hr a 5-hour exposure is possible



Expose 2nd EPerm flux monitors at the same time and subtract open-air results from flux results

Two Eperm flux test averaged **21.34 pCi/sf/hr**
 9% Lower than 3 Liter bowl average **23.5 pCi/sf/hr**

8 Hour - E-PERM[®] Radon Flux Monitor



Use Rad Elec Excel spreadsheet to calculate the Flux

Electret lost
 70 to 88 volts in 8 hrs
 EPerms can easily measure less than 10 pCi/sf/hr

Electret Serial #	Location	Start Date (YYYY-MM-DD)	Start Time (HH:mm)	End Date (YYYY-MM-DD)	End Time (HH:mm)	Total Days Exposure	Initial Voltage	Final Voltage	EIC Config	Individual pCi/sf/hr	True value pCi/sf/hr
SPC860	Flux 2	2025-10-09	08:06	2025-10-09	16:45	0.360	761	673	HST	26.278	20.989
SPC792	Ambient	2025-10-09	08:06	2025-10-09	16:45	0.360	763	745	HST	5.288	
	Flux Monitor										
SPC792	Flux 4	2025-10-12	14:26	2025-10-12	21:56	0.313	711	640	HST	28.612	21.692
SPC860	Ambient	2025-10-12	14:26	2025-10-12	21:56	0.313	658	641	HST	6.920	

CT007 Radon Sniffer Flux Setup

Radon Sniffer sensitivity maximized by increasing footprint and decreasing volume

Two barbed fittings were installed after tapping two holes in cast iron pan

Washers maintain 1/8" air space



4 strands of Mortite installed on the bottom side

Square Foot area
0.63 SF

1.8 X greater than 3 Liter

10 3/4" round by 1/8" = 0.15 liters
CT007 with filter 0.32 liter
Total Volume 0.47 Liters

6.4 X less than 3 Liter

11.5 X more sensitive

CT007 Radon Sniffer Flux Set-Up

The concrete floor must be flat

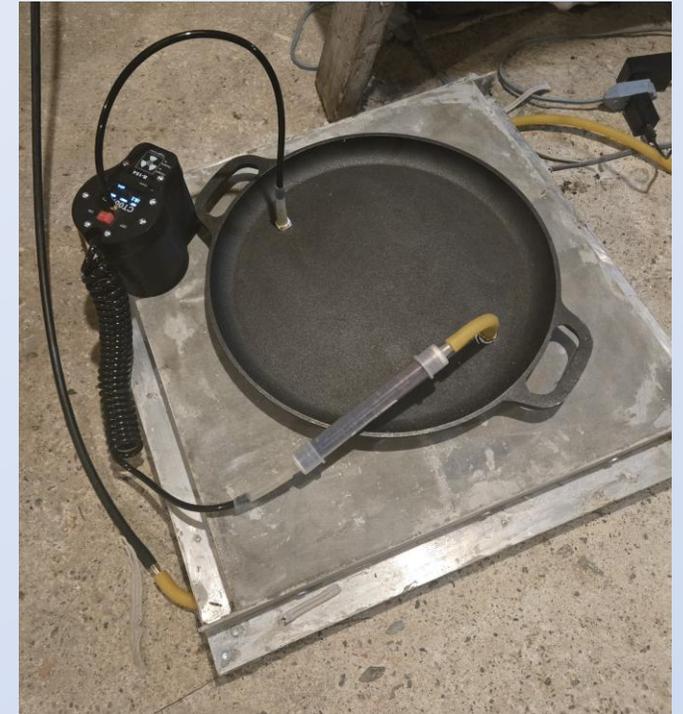


Start Radon Sniffer in low radon air.

Keep cell phone in Bluetooth range



Compress Mortite gasket onto the slab



Run sniffer for up to one hour

Radon Sniffer Flux Calculations

Press disconnect to create an Excel file that can be downloaded

or

Manipulate the slider bar to define radon level and time.

Record pCi/L/minute ingrowth

22 to 45 pCi/l = 23 pCi/L ingrowth
divided by 49 minutes or 0.816 hrs
= 28.16 pCi/hr

28.16 X 0.483 Liters ÷ .63 Sq Ft = **21.6 pCi/sf/hr**
8% lower than average of 3-liter bowl flux

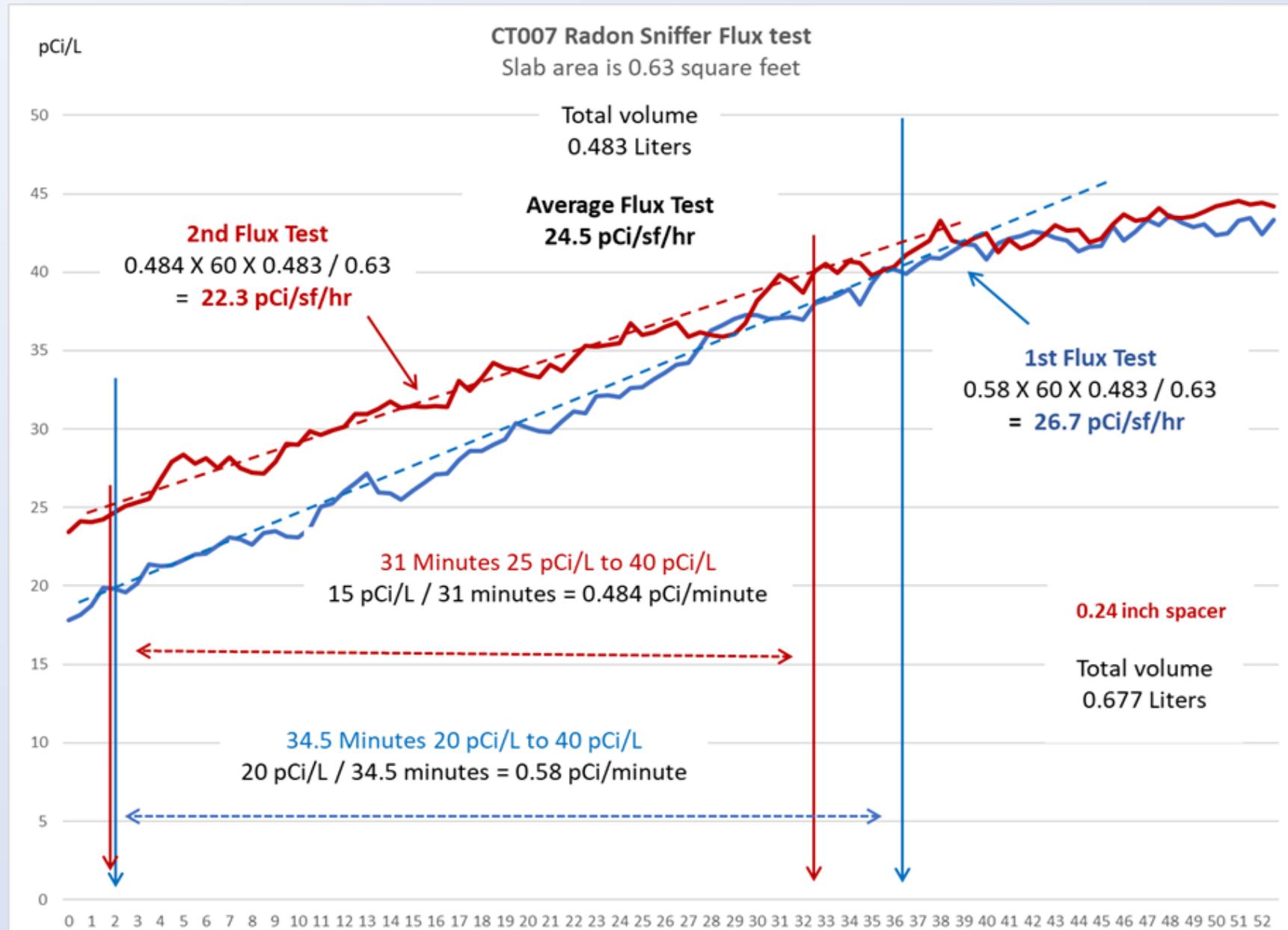
DELETE	GRAPH NAME	OPEN
	October 16, 2025 14:26	CT007-R-154
DELETE	FLUX SOURCE	OPEN
	October 15, 2025 07:48	CT007-R-154
DELETE	WASHER SPACER FLUX	OPEN
	October 13, 2025 21:23	CT007-R-154
DELETE	FLUX WITH MORTITE	OPEN
	October 13, 2025 12:45	CT007-R-154
DELETE	FLUX WITH EPDM GASKET	OPEN
	October 10, 2025 14:18	CT007-R-154
DELETE	2ND SLAB SOURCE	OPEN
	October 9, 2025 12:11	CT007-R-154



Download data log
into a spreadsheet
for more
accurate readings

CT007
Average Flux Rate
24.5 pCi/sf/hr
5% higher
than the 3-liter bowl
average results

Results in
Less than 1 hour



Can Florida's “Radon from Concrete” problem happen elsewhere?

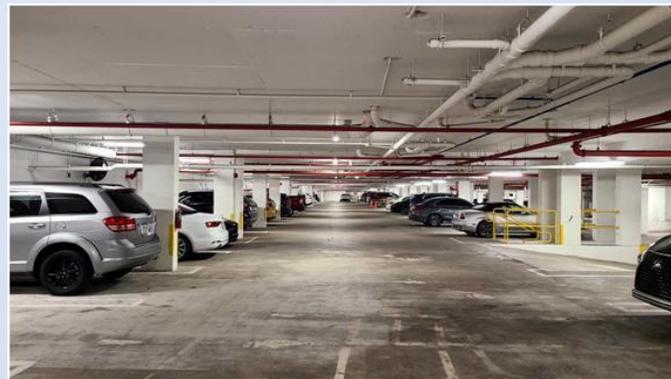
Typical Florida Condo

Multi-stories tall

Concrete floors and ceiling

Sometimes Concrete walls

Garages under the building are ventilated and have no radon



Primary Reasons

Hurricane-proof sliding doors and windows

Lots of Concrete

No Ventilation

0.05 ACH not 0.35 ACH

These same conditions can happen in basements

Elevated radon from concrete means:
These buildings need outdoor air.
But how much ?



Measure indoor temperature and humidity

**Radon can be used as a
Tracer Gas**

Measure radon for 2 days.
Adjust outdoor intake fan to
about 40 CFM = 0.20 ACH
Re-measure radon for 2 days

Divide 40 CFM by
the factor change
in radon – 1

12 to 2 pCi/L = 6X change
 $40/5 = 8$ CFM Natural

The issue with Condos is

Dry Vent
Range Hood Vent
Bathroom Vents
Are the only outdoor air inlets

Condo's typically have
an HVAC closet
with an air handler

HVAC Return Air is
a grill in
HVAC closet door



A 4" passive pipe into HVAC Closet could provide outdoor air

When the air handler was running, the closets were 10 to 53 pascals negative



Type of door grill determined closet negative pressure

Negative pressure moved 46 to 100 CFM in a 4" pipe

Unit #	AC to Room	Box to Room	CFM
K	-53 pascals	-33 pascals	100
L	-42 pascals	-18 pascals	75
M	-25 pascals	-16 pascals	68
N	-9.8 pascals	-7.5 pascals	46

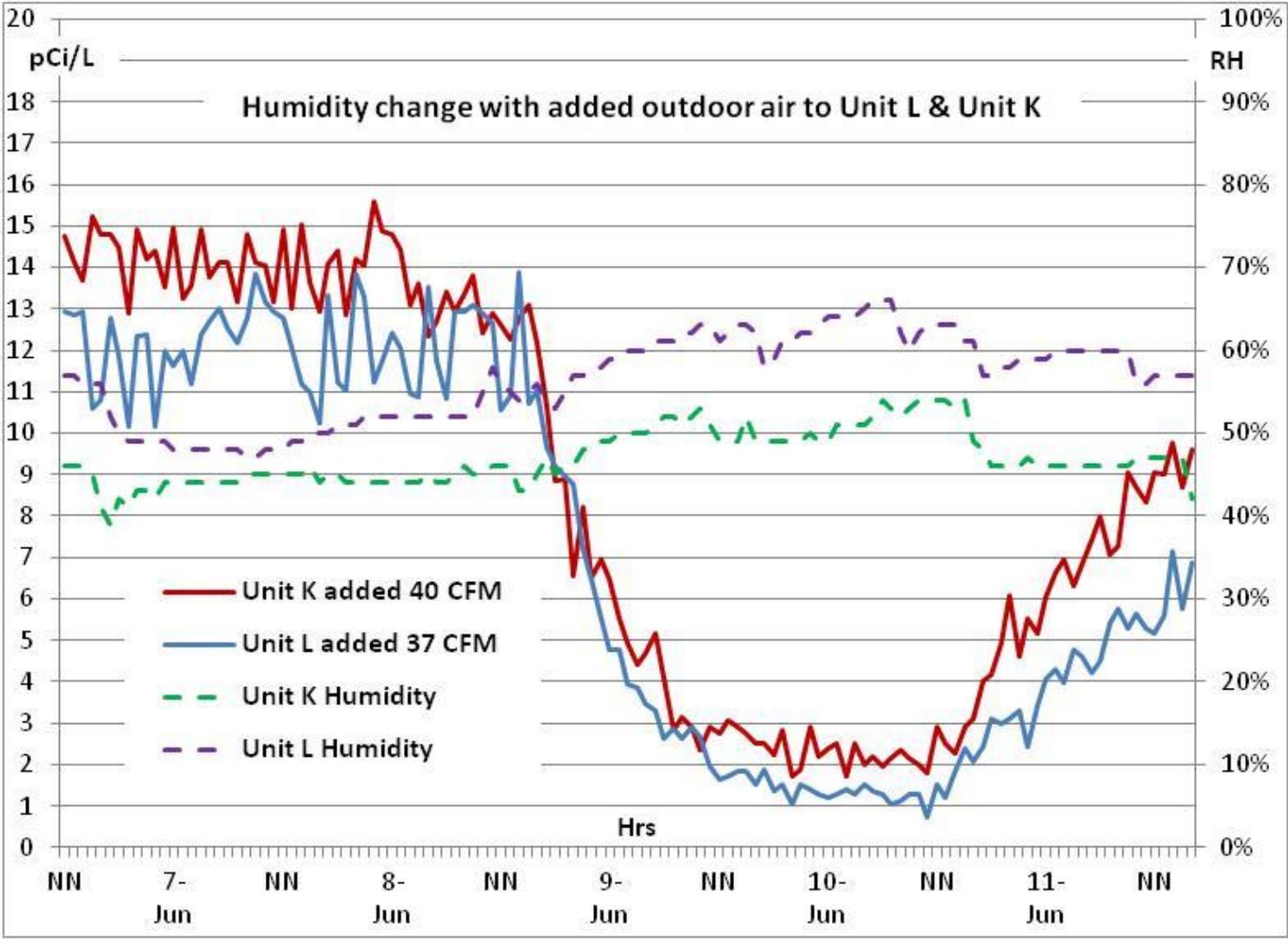
Bringing in outdoor air affects humidity

40 CFM added in Unit K
increased humidity
45% RH to 55% RH

37 CFM added in Unit L
increased humidity
55% RH to 65%RH

Radon Levels fell from
13 pCi/L to about 2 pCi/L

Natural ventilation was 8 CFM
8 CFM = **0.04 ACH**
48 CFM = **0.25 ACH**
68 CFM = **0.35 ACH**



The solution to Concrete Radon Flux is increased ventilation

Three methods of adding Ventilation in Florida Condo's

Whole Building Ventilation	Heat Recovery Ventilator	Direct Fan Ventilation
Commercial Roof Top Unit	Can have humidity recovery	Least costly
100% conditioned supply air	Uses closet space	One duct to the outside
Main duct from roof to each unit	Two duct runs to outdoors	Simple timer or Hvac Sync
Most expensive	Supply duct runs	Possible Mold buildup
Best air quality	Bi yearly maintenance	Takes up HVAC closet space
Least interior work	Most interior construction	

Study Conclusions:

- 1) Residential concrete condominiums are too air-tight
- 2) Concrete floors and walls in air-tight homes cause elevated radon
- 3) Adding mechanical ventilation easily reduces radon from concrete
- 4) Untreated mechanical ventilation in Florida raises humidity
- 5) Passive radon venting can bring in a significant amount of air
but only when the HVAC is operating
- 6) A critical component of Flux testing concrete is an air-tight sealed container
- 7) High-sensitivity, small-volume radon monitors make testing simple.
- 8) The flux test can be done in less than an hour with a sniffer