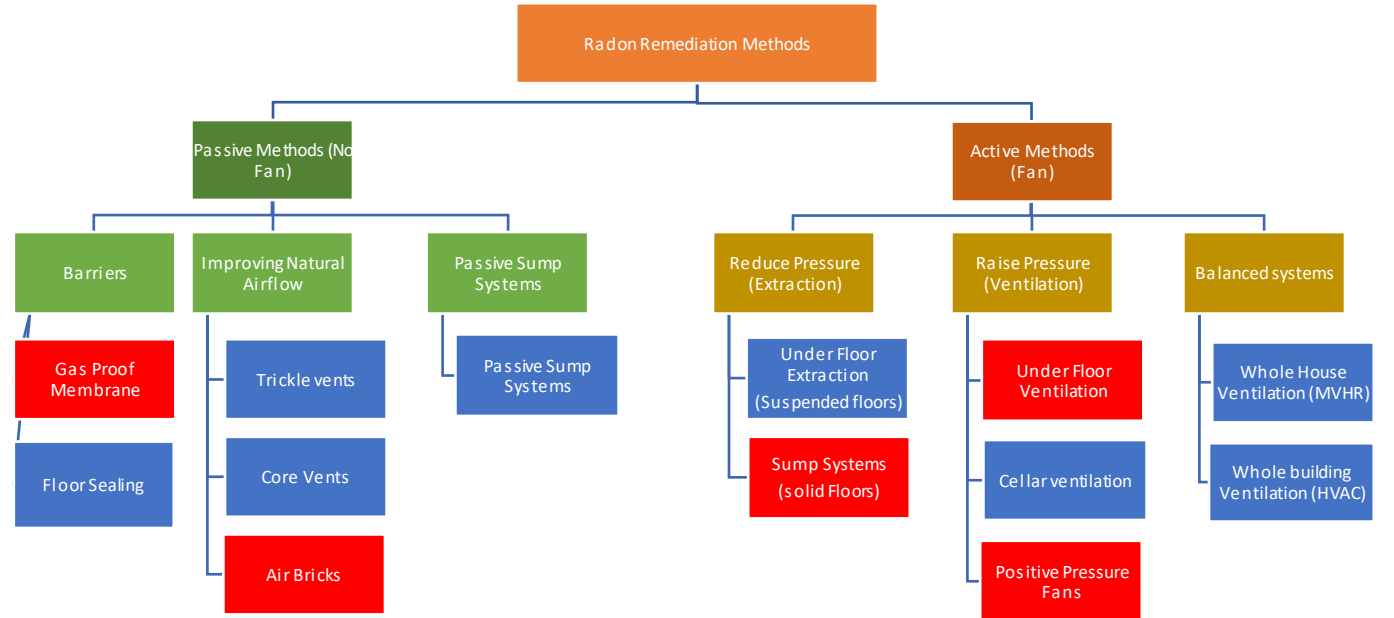


Comparing Radon Remediation Methods

There are many different types of radon remediation



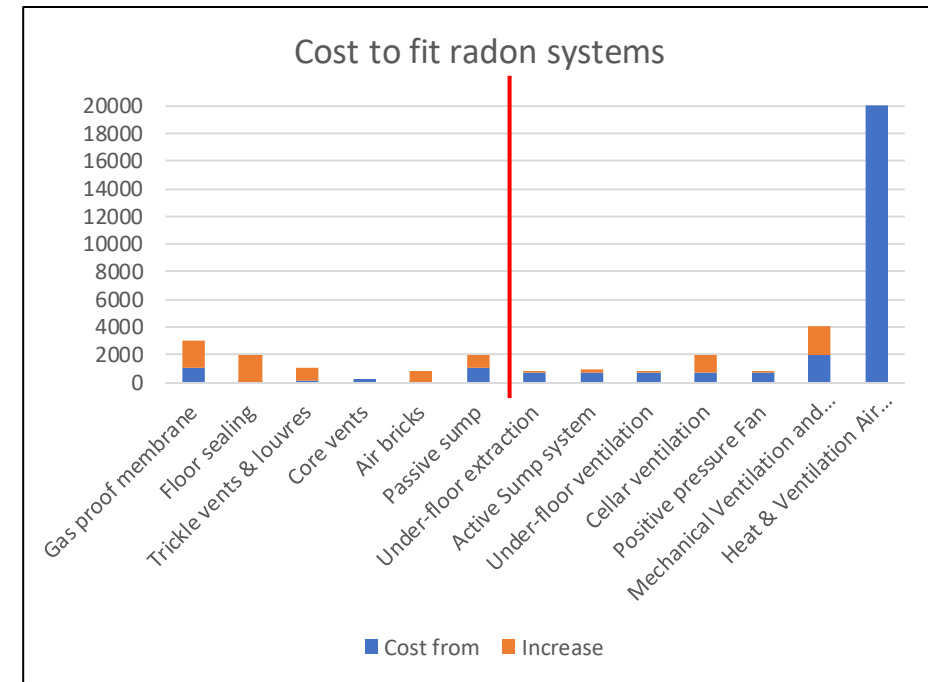
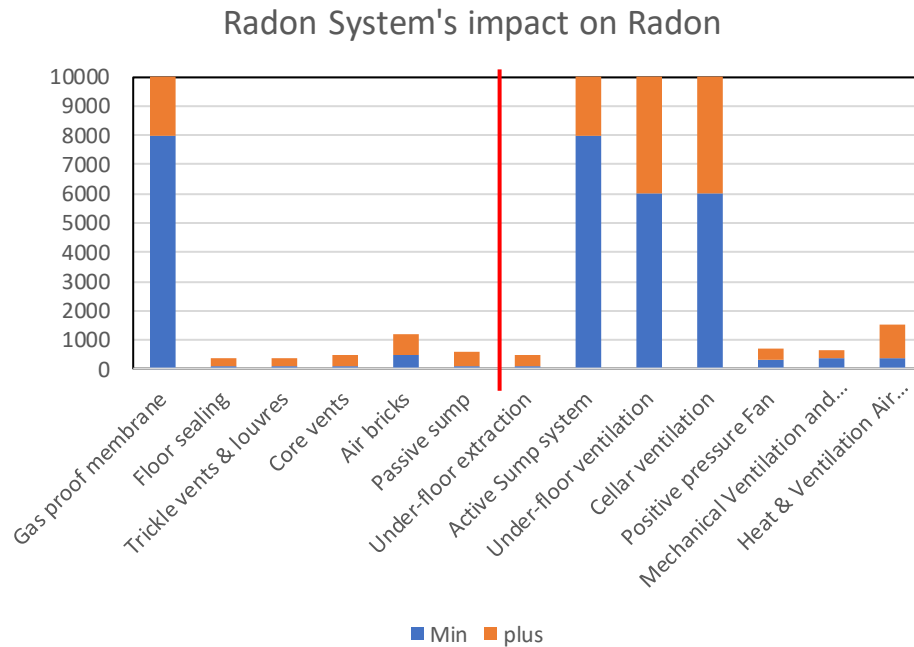
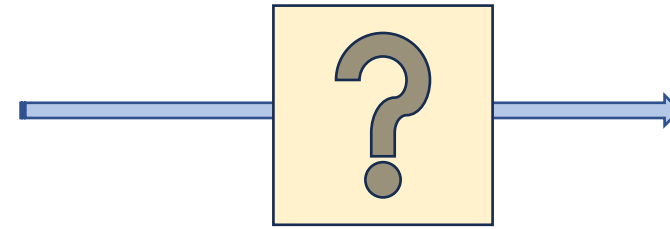
But which one should I choose?



Comparing Radon Systems...

There are many ways to compare radon systems:

- Impact
- cost
- ease of fitment
- on-going commitments/cost
- aesthetics
- compatibility with the property/householder



which radon system should I fit?

- Passive Radon systems: cheaper effective on lower radon concentrations
- Active systems: high impact on radon..... but can cost more
- Different radon systems for different:
 - Floor types (or lived-in space), and
 - Radon concentrations
- Any comparison must include the property the radon system will be fitted to, and the preferences of the householder.....

1. Collect property information

UK Radon Ltd - Radon remediation survey sheet			UK Radon Ltd		
Initial Contact			Plan & fitting notes		
Contact date	Forename	Surname			
Address			Existing kitchen HLBS		
Post code			253 117 265		
Telephone			LR		
Mobile			BR		
Email			15ms		
Radon LK	Radon BR	Radon Avg			
253	117	265			
Contact source			Dining room		
Building type	Building age	Wall type	15ms		
Semi-det hse	<1950	Solid			
Floor type			26ms		
Suspended					
Directions/Comments					
Agent contact			Quote		
telephone			Passive/natural	Active	
Email			Measures		
Address			1. LLORSS	2. HLROSS	
Postcode			3. FBOESS	4. UVS	
Survey: Estimate No. K20/01/22			5. PPF Loft/wall	6. CVS	
Visit date/time 10:30 to 12:30 Thurs 11/2/22			7. ABs/CVs	8. Repair/service/mod	
Existing features			9. Replacements	10. Mon/det	
1. solid floors	2. Suspended fls	3. Abs	description	units	cost
4. Cellar/voids/basement	5. CHS/Core vent	6. chimney/flue			total
7. vents/extractor systems	8. existing system	9. other issues			
Best Location of fan/system and elec point			2x det F.O.C. 123		
Access/electrical notes			Low level monitor for 2nd week		
Consumer box status			DETECTORS SENT 08.04.2022		
RCD yes	No RCD	n/a	3438481 - LR - 144		
Earth TNCS	Earth TNS	Earth TT	3438476 - BR - 138		
RCDs/MCBs	Cartridges	Fuses	AVERAGE - 173		
Good	Average	Poor	Totals		
elec. notes:			date sent	written	email
Fitting date & Installation details			date sent		
Deposit received & date			written		
Job No			email		
Fitting date			verbal		
Balance received & date					

Collect information

Floor type: Suspended floor type

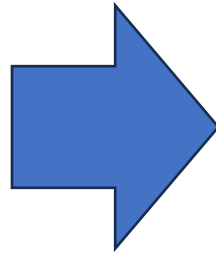
Radon Levels: radon levels only just above action level (265 Bqm⁻³)

Other useful information:

- Under-floor extraction system already fitted
- Large House
- No electrical issues: Electrical socket available
- Access good: No pipes or cables in the way
- Customer has health concerns

2. List the types of remediation possible

UK Radon Ltd - Radon remediation survey sheet		Plan & fitting notes	
Initial Contact Contact date: Forename: Surname: Address: 87 Austell Post code: PL1 9F telephone: Mobile: Email: Radon Ltk: 253 Radon BR: 117 Radon Avg: 265 Contact source: Building type: Semi-det hse Building age: <1950 Floor type: suspended Wall type: solid Directions/Comments:			
Agent contact telephone: Email: Address: Postcode:		Quote Passive/natural Active Measures 1. LLORSS 2. HLROSS 3. FBOESS 4. UVS 5. PPF Loft/wall 6. CVS 7. ABS/CVs 8. Repair/service/mod 9. Replacements 10. Mon/det 11. Other description units cost total	
Survey: Estimate No. K20/0100 Visit date/time: 10-30 to 12-30 Thurs 11/2/20		BUVS 15 2nd BUVS 148 2x det F.o.c. 1233	
Existing features 1. solid floors 2. Suspended fls 3. Abs 4. Cellar/voids/basement 5. CHS/Core vent 6. chimney/flue 7. vents/extractor systems 8. existing system 9. other issues Best Location of fan/system and elec point:		Low level monitor for a few weeks detectors sent 08.04.2022 3438481 - LR - 144 3438476 - BR - 138 Average - 173	
Access/electrical notes:		Totals date sent written email verbal	
Consumer box status: n/a RCD yes: No RCD a/m Earth TNCS: Earth TNS Earth TT RCBs/MCBs: Cartridges Fuses Good: Average Poor elec. notes:		Fitting date & Installation details Deposit received & date: 16/02/20 9/1/20 Job No: K20/ Fitting date: Tues Balance received & date:	



Possible remediation

Floor type: Suspended floor type

Radon Levels: radon levels only just above action level (265 Bqm⁻³)

Other useful information: Under-floor extraction system already fitted

So, many remediation options available:

- Upgrade existing Air bricks
- Trickle Vents
- Upgrade existing system with bigger fan
- Fit an Under-floor Ventilation System

3. Then narrow the options

UK Radon Ltd - Radon remediation survey sheet

Initial Contact
 Contact date: Forename: Surname: [blank]
 Address: 87 Austen
 Post code: PL 9F
 telephone: [blank]
 Mobile: [blank]
 Email: [blank]
 Radon Lic: 253 Radon BR: 117 Radon Avg: 265
 Contact source: [blank]
 Building type: Semi-det hse Building age: <1950
 Floor type: suspended Wall type: solid
 Directions/Comments: [blank]

Plan & fitting notes
 Existing Hatched HLOUES
 Dining room
 CR
 1.6m
 2.6m

Quote
 Measures: 1. LLORSS 2. HLROSS 3. FBOESS 4. UVS 5. PPF Loft/wall 6. CVS 7. ABS/CVs 8. Repair/service/mod 9. Replacements 10. Mon/det 11. Other
 description units cost total

Survey: Estimate No. K20/153
 Visit date/time: 10:30 to 12:30 Thurs 11/12/20
 Existing features:
 1. solid floors 2. Suspended fls 3. Abs 4. Cellar/voids/basement 5. CHS/Core vent 6. chimney/flue 7. vents/extractor systems 8. existing system 9. other issues
 Best Location of fan/system and elec point: [blank]
 Access/electrical notes: [blank]
 Consumer box status: n/a
 RCD yes: No RCD a/m
 Earth TNCS: Earth TNS Earth TT
 RCBs/MCBs: Cartridges Fuses
 elec. notes: Average Poor
 Fitting date: Tues
 Balance received & date: [blank]

Handwritten notes:
 BUUVS 85
 2nd BUUVS 148
 2x det F.o.c. 1233
 Low level monitor for a few weeks
 detectors sent 08.04.2022
 3438481 - LR - 144
 3438476 - BR - 138
 Average - 173



Possible remediation

Floor type: Suspended floor type

Radon Levels: radon levels only just above action level (265 Bqm⁻³)

Other useful information: Under-floor extraction system already fitted

So, many remediation options available:

- Upgrade existing Air bricks
- Trickle Vents
- Upgrade existing system with bigger fan
- Fit an Under-floor Ventilation System



Outcome

ABs could work, upgrade HLOUES possible,

but customer wanted to make sure of result because of health issues

So, we decided to support the existing system with ventilation = 2 x under-floor ventilation fans were fitted at the front of the house

Result = 173 Bqm⁻³

Summary

- There are many ways to compare radon systems.....

and there is no one correct way of doing it

So,

- First, gather as much relevant information about the property as you can...
 - Radon levels
 - Floor type
 - Other constraints of the house structure

Opportunity/Choice:

list how many different radon systems will work on that property.

Best Value:

narrow down the options to the 'Best Value' choice for that owner/property



Stage 2. Look at all the possible systems you can fit, considering the property information

Fan	Type	Floor/space	Method	Min Bqm-3	Max Bqm-3	Advantage	Disadvantage	Cost from	Cost to
Passive	Barrier	all	Gas proof membrane	100	10000	Very effective with new build	Difficult to fit retrospectively, and very difficult under suspended floor retro fitted	1000	4000
Passive	Barrier	Lived in space	Floor sealing	50	300	Effective if large holes filled	Very labour intensive, with variable results	50	2000
Passive	Natural Airflow	Lived in space	Trickle vents & louvres	50	150	Effectitve in Summer	Must be permanent vents, so cold in winter	150	1000
Passive	Natural Airflow	Lived in space	Core vents	50	400	Works well with fireplaces	May not always work	100	200
Passive	Natural Airflow	suspended	Air bricks	50	750	Can work well with a good cross-flow	Blockages and sub-floor obstructions can reduce performance	35	800
Passive	Passive Sumps	all	Passive sump	50	350	A fan can be fitted to the sump if it deosn't work well	Variable results, low to medium impact	800	2000
Active	Reduce pressure	suspended	Under-floor extraction	50	350	Can work, especially in conjunction with a positive pressure in the lived-in area	Sometimes a poor, or even negative result	650	850
Active	Reduce pressure	all	Active Sump system	200	10000	The best radon system to fit under a solid floor.	Need a capping to fit under a suspended floor	700	2500
Active	Increase pressure	suspended	Under-floor ventilation	50	10000	The best radon system to fit under a suspended floor.	Blockages and sub-floor obstructions can reduce performance	650	850
Active	Increase pressure	cellar	Cellar ventilation	100	10000	Very useful in unoccupied cellars	Cannot be used in lived-in cellars	650	2000
Active	Increase pressure	Lived in space	Positive pressure Fan	50	400	Very useful at low to medium levels of radon. Wall mounted units good in flats or offices	Not effective in large houses, high radon levels. Can cause drafts	650	850
Active	Whole building ventilation	Lived in space	Mechanical ventilation and heat recovery (MVHR)	50	300	Can bring radon levels down if adjusted to a slight positive pressure	Poor adjustment can lead to radon problems. Generally can only be fitted on a new house	2000	4000
Active	Whole building ventilation	Lived in space	Heat & Ventilation Air Conditioning (HVAC)	50	1500	Can bring radon levels down if adjusted to a slight positive pressure	Poor adjustment can lead to radon problems. Can only be fitted on a new building	20000	50000

Building	1 Bed Flat	2 bed house	3 bed house	Office	Office	Office (1 st Floor)	Large office block	Large office block
Floor type	Solid	solid	suspended	solid	suspended	n/a	solid	solid
Radon level	230	340	450	635	780	310	690	340
On-site notes	Central heating	Fireplace in living room where highest radon result comes from	Only two air bricks observed		Central heating. Single storey building, with cellar	No ground floor, so lived-in space remediation required	Two rooms above action level at corner of building	Many rooms above action level. HVAC installed
Passive	Trickle vents Core vents Passive sump	Trickle vents Core vent Passive sump Air bricks	Trickle vents Core vent Passive sump Air bricks	Trickle vents Core vent Passive sump	Trickle vents Core vent Passive sump Air bricks	Trickle vents Core vent	Trickle vents Core vents Passive sump	Trickle vents Core vents
Active	Sump system Positive pressure fan MVHR	Sump system Positive pressure fan MVHR	Under-floor ventilation Positive pressure fan MVHR	Sump system Positive pressure fan MVHR	Under-floor ventilation Positive pressure fan MVHR	Positive Pressure fan MVHR	Sump system	Adjust HVAC
Best Value	Trickle vents, may work, but cold in the winter? Positive pressure fan (wall mounted) A sump system would be very effective	A core vent may cure the problem, but a sump system would be very effective. Probably a positive pressure fan	Air bricks cheaper, and could work well. Under-floor ventilation more effective	Passive sump? Fit a fan if it doesn't work = sump system would be very effective	Probably an under-floor ventilation system, but air bricks could be tried first.	Trickle vents, may work, but cold in the winter? Otherwise, a positive pressure fan (Wall mounted?)	A passive sump, but if it doesn't work fit a fan to make a sump system, or two	Adjust HVAC and educate ventilation engineer on radon

Method	Floor Types	Effectiveness	Cost	Cost to Run (at 14p per kWh)	Maintenance and Life expectancy	Advantages/disadvantages Comments
Fan assisted sump - Low level outlet	Solid, or	High and low level outlet sumps are the most effective method, and work for the highest levels of radon.	From £645 +£50 for stone walls	50W fan costs about £60pa	Fans have 2 year guarantee but usually last much longer. A replacement fan costs about £120	Sometimes difficult to find suitable spot – noise, space
Fan assisted sump - High level outlet	Suspended with concrete sub-floor		From £765 (bungalow) +£50 per storey			More costly because more materials used + greater visual impact
Passive sump (no fan)	Solid, or Suspended with concrete sub-floor	Effective to 400bq Limited effectiveness up to 800bq	From £495	None	N/A	Can add a fan later if not effective (Cost from £395)
Positive Pressure fan	All types	Effective to 600bq Limited effectiveness up to 1000bq	From £545	Fan 5W (average speed) costs about £6 pa. 500W heater about £1.70 per day.	5 year guarantee but usually lasts longer. Replace filter after 5 years	Very quiet Helps with damp and condensation Can cause draughts House needs to be airtight for maximum effect.
Underfloor ventilation - Axial fan in wall	Suspended	All the fan-assisted underfloor ventilation systems can be very effective up to the highest levels of radon.	From £545	18w fan costs about £22 pa	Fans have a 2 year guarantee but usually last much longer.	Method used depends on the nature of the property and the level of radon. Fans under the floor can be noisy (a silencer may be fitted if necessary).
Underfloor ventilation - Fan under floor (small or large fan)	Suspended		From £545	18W fan = £20 pa 50W fan = £55 pa		
Underfloor ventilation - External fan (large)	Suspended		From £545	50W fan costs about £55 pa		
Underfloor ventilation - small fan over an airbrick (“birdbox”)	Suspended		From £545	18W fan costs about £20 pa		Can be fitted over an existing airbrick. Useful where airbricks below ground level.
Natural underfloor Ventilation (airbricks)	Suspended	Effective to 300bq Limited effectiveness up to 800bq	From £40 per airbrick	N/A	Need to check if blocked or obstructed.	Should be on opposite walls, 1.5 – 2 metres apart.
Sealing Floor gaps	Concrete floors	Effective to 400bq Less up to 500bq	DIY recommended	N/A		All gaps need to be sealed to be effective.
Sealing Floor – DPM	New concrete		From £495	N/A		
Natural ventilation trickle vents, capped chimneys, sealed loft hatches, open downstairs windows	All types	Effective to 300bg Limited effectiveness up to 500bq	Varies			General principle is to avoid a chimney effect by providing vents & opening windows downstairs, but keeping upstairs airtight.