SOIL GAS VENTING SYSTEM

RadonX™
SOIL GAS VENTING

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- Reducing indoor soil gas concentrations and health risks associated with radon gas
- Complete system of gas collection and vent pipes, fittings, solvent cement and venting accessories
- Tested for the application for improved performance and safety
- Unique product features, markings and warning labels for ease of identification

IPEX
by aliaxis

Peace Of Mind From The Ground Up™

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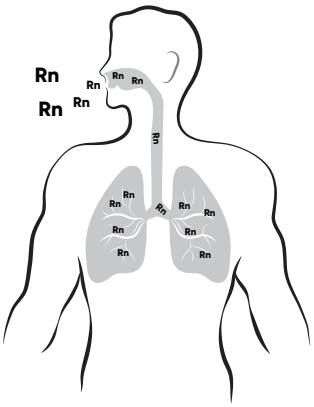
What is Radon?

Radon is a colourless, odourless gas that occurs naturally from the decay of uranium, a natural radioactive material found in all soil and rock. As radon breaks down, it forms radioactive particles that could get lodged into our lungs as we breathe. The energy released by radon particles could damage lung cells creating lung cancer. Not everyone exposed to radon gas will develop lung cancer, and the time between exposure and the onset of the disease could take many years. This is why radon gas is known as a silent killer.

Radon gas can accumulate to dangerous levels inside a home and become a risk to human health. It can enter the building through openings in contact with soil such as cracks in foundation walls, floor slabs and gaps around service pipes and floor sumps etc. Similar to other gases, it can diffuse through porous materials including concrete walls and slabs.



Did You Know?

Radon is the #1 cause of lung cancer for non-smokers

Radon is the second leading cause of lung cancer after smoking. More than 3,000 people die from radon-induced lung cancer every year in Canada*.

* canada.ca/en/health-canada/services/health-risks-safety/radiation/radon/take-action-on-radon.html

How can indoor Radon gas levels be reduced?

The most common and effective radon reduction method is called sub-slab depressurization. This involves installing a pipe through the foundation floor slab that draws the radon gas from below the home and releases it into the outdoors where it is quickly diluted.

New construction:

In new construction, there are three installation methods of soil gas vent piping:

1. Level-1 type. Radon rough-in

The capped rough-in stub (Level-1) is not a complete radon reduction system. It only allows the future addition of a full passive or active piping system if the home tests high for radon after occupancy.

2. Level-2 type. Full passive stack

Indoor radon levels can be reduced by installing a full passive vent stack (Level-2) that consists of:

1. a perforated pipe below the foundation floor that collects radon gas; and
2. a full vent stack that runs upwards throughout the inside of the building releasing the gas outside above the roof.

In the majority of cases, the combination of 1 and 2 is sufficient to lower radon levels to acceptable limits within the house. It is more practical and economical to install a passive stack during construction of a new home. In order to reduce the health risks of radon gas, IPEX recommends that all new low-rise residential homes should be constructed to have a full passive stack for soil gas venting.

3. Level-3 type. Active stack

If required, or desired, further reduction can be achieved by installing a radon fan to the vent stack converting the depressurization system into an active one (Level-3). Radon fans operate continuously throughout the year.

OR

Many municipalities are being proactive in requiring a full vent stack to reduce radon levels in homes and have dedicated radon programs for new construction. As a minimum, it is critical to install the sub-slab pipe and radon rough-in stub (Level-1) as per the National Building Code 2015 requirements in the event that future radon mitigation is required.

Existing construction:

In existing buildings, it is not practical to install a sub-slab pipe and/or a full vertical stack. Therefore, the majority of retrofit applications for soil gas venting are completed with a radon fan where the piping system is terminated on a side wall. These installations are critical as there are too many factors affecting the overall efficiency such as the number of suction points, the location of those in the basement, sealing of the cut openings and code approved terminations. IPEX recommends that all retrofit applications for existing homes be carried out by a professional who is certified under the Canadian National Radon Proficiency Program (C-NRPP). Please visit c-nrpp.ca for more information.

RadonX™ Soil Gas Venting

IPEX is proud to offer RadonX™, the first PVC piping solution that is specifically designed, tested and labeled to address the need for collecting and venting soil gas from the sub-slab area to help reduce indoor radon levels. Focusing on low-rise construction, RadonX is designed to maximize system integrity including compatible gas collection (perforated) and vent (non-perforated) pipes, fittings, solvent cement and accessories. The physical dimensions and tolerances of RadonX pipe and fittings comply with CSA B181.2 and Section 9.13 Soil Gas Ingress of the 2015 National Building Code of Canada.

Description	RadonX™ pipe and fittings
Nominal Size	4" – 100mm
Wall thickness	Schedule 40

Did You Know?

RadonX Soil Gas Venting helps reduce humidity and Volatile Organic Compound (VOCs) levels in basements.

Research* shows that soil gas depressurization systems can lower humidity levels and VOCs that originate from contaminated soils and groundwater and enter basements through cracks and openings similar to radon gas.

* Exploratory Study of Basement Moisture During Operation of ASD Radon Control Systems , 2007

Assessment of Mitigation Systems on Vapor Intrusion: Temporal Trends, Attenuation Factors, and Contaminant Migration Routes under Mitigated And Non-mitigated Conditions, 2015

Description	Standards	RadonX™
Tolerances and dimensions	CSA B181.2; ASTM D2665	✓
All material and testing requirements	CSA B181.2; ASTM D2665	✓
Gas venting system performance tests -Gas leakage -Pull-out -Torque -Combustibility	ULC S636	✓
Solvent cement	ASTM D2564	✓
Product markings	CGSB/CAN 149.11; CGSB/CAN 149.12	✓

Meeting Standards

While there is no dedicated piping standard (at this time) for the application of soil gas venting, RadonX™ is tested to and complies with the following recognized standards.

Not like any other piping systems found in low-rise construction

Up until now, soil gas venting systems have been often mistaken for Drain, Waste and Vent (DWV), Flue Gas Venting (FGV) and Electrical conduit used in residential construction. After occupancy, the lack of proper labeling have resulted in unwanted incidents where Level-1 radon stubs have been used for plumbing/toilet rough-ins in basement renovation projects! With RadonX's unique product features and markings, soil gas venting systems now can be easily identified by contractors, inspectors and home-owners.

NOTICE:

RadonX™ is a PVC piping system to be used in soil gas depressurization systems to reduce indoor radon concentrations. RadonX does not treat or cure cancer. Once the building is occupied, continued radon concentration measurements shall be performed. Consult the C-NRPP, National Radon Proficiency Program at c-nrpp.ca for details as to frequency and guidelines to follow. RadonX Installation and Technical Guide contains many critical aspects of radon gas venting, technical data on products as well as safety precautions. Please refer to RadonX Installation and Technical Guide to ensure successful, code-compliant and safe installations. The installation guide is available at www.ipexna.com

A. Fitting warning labels

are not only for ease of identification but encourage installers to use proper joining methods.

B. Pipe warning labels

meet CAN/CGSB 149.11 and CAN/CGSB 149.12 guidelines.

C. Yellow print-lines

are printed on both sides of the pipe (180 degrees apart) that includes the material type, its intended application (below or above ground use) and conforming standards.

D. RadonX soil gas venting and collection pipes

are grey in colour featuring interior and exterior layers and white in the centre layer.

E. Ultra low VOC PVC solvent cement

is yellow in colour and includes an optical brightener as an additive that is visible under UV light for identification of the proper cement for the application.

F. Unique perforation

features 6-row hole-drilling pattern.

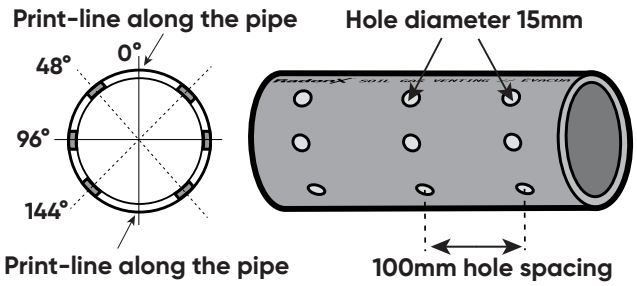
Tested for the Application, Performance and Safety

RadonX™ Soil Gas Venting has gone through various material and performance tests to ensure product quality. Additional material and system type field tests have been conducted by third party testing facilities for improved performance and safety in soil gas venting.

1. Improved Airflow with RadonX Gas Collection Pipe

RadonX perforated pipe is specifically designed to collect soil gas in the sub-slab area. To be used in below ground installations only, the smooth interior surface and the unique perforation pattern of RadonX gas collection pipe enables improved air movement in the sub-slab area. This results in higher airflow rates in the vent stack. The 6-row hole-drilling pattern creates a total perforation area of approximately 100cm^2 per meter of pipe. Increased perforation and clean-cut circular holes reduce the risk the of clogging during installation and over its service life.

The rigid Schedule40 construction meets the minimum CSA requirement for pipe stiffness of 1700 kPa, which helps it to resist soil loads and other external stresses.



2. Gas-Tight Joints

Advanced PVC formulation

The strong solvent welded joints of RadonX pipe and fittings are tested for gas leakage, torque and pull-out tests from the flue gas venting standard, ULC S636. The advanced PVC formulation of RadonX also passes the combustibility test of ULC S636.

3. Negligible Risk of Radon Gas Diffusion:

Radon diffusion through pipe material can demonstrate how likely radon gas can diffuse through the wall of the pipe and into the buildings. This could be even more critical in basements where radon enriched gas is trapped in capped rough-in pipe stubs installed for longer durations (Level-1). The likelihood of this occurring would depend on radon diffusion coefficient and thickness of the pipe material. The radon diffusion coefficient D (m^2/s) is a material property that would vary in every PVC formulation. The higher the radon diffusion coefficient, the more radon that would diffuse into the surroundings. Radon resistance* is a more accurate way of evaluating the effectiveness of a material in reducing or preventing radon entry, especially for materials of varying thicknesses. Based on the test results performed by a third party testing facility, for Schedule40 thickness, the 4" RadonX pipe material has a radon resistance value of $6.46x10^9$ (s/m). This is substantially (2 orders of magnitude) higher than that of the 6 mil polyethylene vapour membrane. The RadonX PVC pipe compound is considered suitable for venting soil gas containing radon with negligible risk of radon diffusing through the wall of the piping system.

Description	Polyethylene membrane	RadonX PVC pipe material
Radon diffusion coefficient - D (m^2/s)	$8.05x10^{-12}$	6.02×10^{-12}
Radon resistance -R_{Rn} (s/m)	$1.9x10^7$	6.46×10^9

* Defined by Jiranek and Svoboda, 2017

Features and Benefits of Installing RadonX™

- Reducing indoor soil gas concentrations and health risks associated with radon gas
- Low maintenance solution for soil gas, humidity and VOC reduction in low-rise construction
- Complete piping system meeting standards and relevant building codes
- Compatibility of all RadonX pipes, fittings, accessories and solvent cement
- Products tested for soil gas venting application
- Greater airflow in the sub-slab area with perforated gas collection pipe
- A protective rain cap
- Ease of identification with unique product features, markings and bilingual warning labels
- Ultra low VOC PVC solvent cement
- Availability of cutting and beveling tools to ensure proper joint installation
- Installation training and literature support

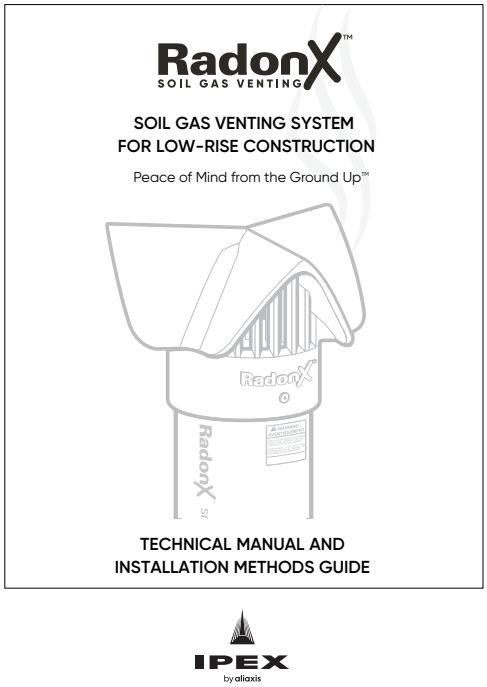
RadonX pipe, fittings and cement are tested as a piping system and must be installed as such.
Different manufacturers have different materials, tolerances, joining systems and/or cements. Do NOT mix pipe, fittings, solvents or joining methods from different manufacturers. Do NOT use other IPEX products that are not listed in the brochure. This can result in unsafe conditions and will void the warranty of the affected system.

RadonX™ Installation and Training

RadonX technical manual and installation methods guide can be obtained by contacting IPEX or may be viewed online on the RadonX Soil Gas Venting product page found at ipexna.com

RadonX installation training is available. Contact IPEX for more details. IPEX recommends that installers attend formal training on RadonX to ensure proper installation methods are utilized at all times.

Continuing radon concentration measurements shall be performed once the building is occupied. Consult the C-NRPP, National Radon Proficiency Program at c-nrpp.ca for details as to frequency and guidelines to follow. Always refer to the latest edition of acceptable indoor radon gas levels in local building codes or Health Canada Guidelines.

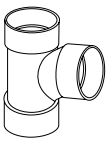


PRODUCT SELECTION CHART - RADONX

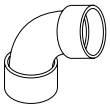
	Dimension inches	Dimension mm	Product Code
Soil Gas Vent Pipe (Plain End x 10 ft)	4	100	181004

Soil Gas Collection Pipe – Perforated (Plain End x 10 ft)	4	100	181008

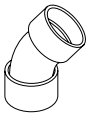
SGV Tee-Wye H x H x H	4	100	286084



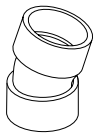
SGV 90° Elbow H x H	4	100	286124



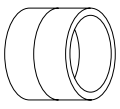
SGV 45° Elbow H x H	4	100	286244



SGV 22-1/2° Elbow H x H	4	100	286254

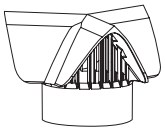


SGV Coupling H x H	4	100	286354

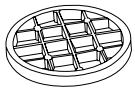


	Dimension inches	Dimension mm	Product Code
SGV Cap	4	100	286414

SGV Rain Cap	4	100	286715

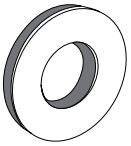


PE Termination Vent Screen	4	100	196052

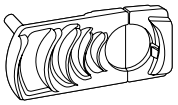


Friction fit inside fitting hub at termination to prevent debris & rodents from entering vent.

Faceplate – Round (w/ self sealing foam back)	4	100	197055



Deburring Tool (DEB 4)	1-1/2 - 4	40 - 100	196246



To ensure quality solvent weld connections, deburr all pipe ends prior to cementing.

	Volume imperial	Volume metric	Product Code
SGV PVC Cement (Eco - Ultra Low Voc) Yellow	quart	946ml	286041

SALES AND CUSTOMER SERVICE

IPEX Inc.

Toll free: (866) 473-9462

ipexna.com

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have earned a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing & mechanical, and electrical cements
- Irrigation systems
- PVC, CPVC, PP, PVDF, PE, and ABS pipe and fittings

RadonX™ Soil Gas Venting pipe, fittings and venting accessories are manufactured by IPEX Inc. and/or IPEX USA LLC and RadonX piping system is distributed in Canada by IPEX Inc., Mississauga, Ontario.

IPEX by aliaxis

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