

Radon Mitigation

Quality Assurance

And

Standard Operating Procedures

Dated _____

By _____

Radon Mitigation Specialist

Quality Assurance Officer

Table of Contents

1. Organization and Responsibility
2. General Practices
3. Building Investigation
4. System Design
5. System Installation and Materials
6. Monitors & Labeling
7. Post Mitigation Testing
8. Contracts, Documentation and Records

1. Organization and Responsibility

The following organizational diagram shows the relationship and structure of the Radon Mitigation division of _____

President: _____

Quality Assurance Officer: _____

Mitigation Foreman: _____

The President supervises all operations and enforcement of Standard Operating Procedures and Quality Assurance program details.

The Quality Assurance Officer will be responsible for implementing the provisions of the Quality Assurance Program. Will report any changes in this program to the Iowa Department of Public Health, Radon Mitigation Division. Will schedule all continuing education classes for mitigation as required by Iowa Department of Public Health Radon division.

2. General Practices

The following general practices are required for all contacts between _____ and clients.

The initial contact with a client, shall review any available results from previous radon tests to assist in developing an appropriate mitigation strategy.

Based on the information contained in "A Citizen's Guide to Radon" I will refer the client to interpreting indoor radon test results and the health risk associated with the radon level found in the building. The "Consumer's Guide to Radon Reduction" provides advice on actions to take to reduce indoor radon levels.

When delays in the installation of a permanent radon control system are unavoidable due to building conditions or construction activities, and a temporary system is installed, I will inform the client about the temporary nature of the system. A label that is readable from at least three feet shall be placed on the system. The label will include a statement that the system is temporary and that it will be replaced with a permanent system within 30 days. The label will also include the date of the installation, my name, phone number, and RCP Identification Number, (Exception: the 30 day limit on use of a temporary mitigation system may be extended in cases where a major renovation or change in building use necessitates a delay in installation of a permanent mitigation system that is optimized to the new building configuration or use. The appropriate state or local building official or radon program official should be notified when this exception is being applied.)

When the selected mitigation technique requires use of sealant, caulks, or bonding chemicals containing volatile solvent, prior to starting work. I will inform the client of the need to ventilate work areas during and after the use of such materials. Ventilation shall be provided as recommended by the manufacturer of the material.

3. Building Investigation

I will conduct a thorough visual inspection of the building prior to initiating any radon mitigation work. The inspection will identify any specific building characteristics and configuration (e.g. large cracks in slabs, exposed earth in crawlspaces, open stairways to basements) and operational conditions (e.g. continuously running HVAAC systems or operational windows) that may affect the design, installation, and effectiveness of radon mitigation systems. As part of my inspection, clients will be asked to provide any available information on the building (e.g. construction specifications, pictures, drawings, etc.) that might be of value in determining the radon mitigation strategy.

To facilitate selection of the most effective radon control system I will conduct diagnostic test to assist in identifying and verifying suspected radon sources and entry points. The use of chemical smoke sticks will be the type of diagnostic testing commonly used.

I will perform diagnostic test to evaluate the existence of, or the potential for, back drafting of natural draft combustion appliances using Retrotec Smoke Puffer or equal device.

4. System Design

All radon mitigation systems shall be designed and installed as permanent, integral addition to the building.

All radon mitigation systems shall be designed to avoid the creation of other health, safety, environmental hazards to building occupant, such as back drafting of natural draft combustion appliances as described in Radon Mitigation Standards.

All radon mitigation systems shall be designed to maximize radon reduction and in consideration of the need to minimize excess energy usage, to avoid compromising moisture and temperature controls and other comfort features, and to minimize noise.

All radon mitigation systems and their components shall be designed to comply with the laws, ordinances, codes, and regulations of relevant jurisdictional authorities, including applicable mechanical, electrical, building, plumbing, energy, and fire prevention codes.

5. System Installation and Materials

All components of radon mitigation systems installed in compliance with provisions of the RMS shall also be in compliance with the applicable mechanical, electrical, building, plumbing, energy and fire prevention codes, standards, and regulations of the local jurisdiction.

I will obtain all required licenses and permits, and display them in the work areas as required by local ordinances.

Where portions of structural framing material must be removed to accommodate radon vent pipes, material removed shall be no greater than that permitted for plumbing installations by applicable building or plumbing codes.

Where installation of a radon mitigation system requires pipes or ducts to penetrate a firewall or other fire resistance rated wall or floor, penetrations shall be protected in accordance with applicable building, mechanical, fire, and electrical codes and sealed with DAP FireStop or equal caulking and/or Firestop Collar from Retrotec or equal.

When installing radon mitigation systems that use sump pits as the suction point for active soil depressurization, if sump pumps are needed, it is recommended that submersible sump pumps be used. Sump pit shall be sealed with GE Silicon II or equal caulking.

All joints and connections in radon mitigation systems using plastic vent pipes shall be permanently sealed with adhesives as specified by the manufacturer of the pipe material used.

When installing fans, joints or connections in other vent pipe materials shall be made airtight.

To prevent re-entrainment of radon, the point of discharge from vents of fan-powered soil depressurization and block wall depressurization systems shall meet all of the following requirements: (1) be above the eaves of the roof, (2) be ten feet or more above ground level, (3) be ten feet or more from any window, door, or other opening into conditioned spaces of the structure that is less than two feet below the exhaust point, and (4) be ten feet or more from any opening into an adjacent building. The total required distance (ten feet) from the point of discharge to openings in the structure may be measured either directly between the two points or be the sum of measurements made around intervening obstacles. Whenever possible, the exhaust point should be positioned above the highest eaves of the building and as close to the roof ridge line as possible.

All vent piping shall be installed, anchored and sealed according to recommended procedures in the Radon Mitigation Standards. (3" and/or 4" Brisolpipe Schedule 40- 1120-220psi or equal)

Vent fans used in radon mitigation systems will be designed or otherwise sealed to reduce the potential for leakage of soil gas from the fan housing. Fans to include RadonAway XP-101 to GP501 or equal.

Radon vent fans shall be sized to provide the pressure difference and airflow characteristics necessary to achieve the radon reduction goals established for the specific mitigation project.

Radon vent fans used in active soil depressurization or block wall depressurization systems will not be installed belowground nor in the conditioned (heated/cooled) space of a building nor in any basement, crawlspace, or other interior location directly beneath the conditioned spaces of a building.

All seal requirements will be met as required in Radon Mitigation Standards. DAP Concrete and Mortar Filler and Sealant or equal will be used to seal cracks.

Wiring for all active radon mitigation systems shall conform to provisions of the National Electric Code and any additional local regulations.

Any plugged cord used to supply power to a radon vent fan will be no more than 6 feet in length.

Radon mitigation fans installed on the exterior of buildings will be hard-wired into an electrical circuit. Plugged fans shall not be used outdoors.

All mitigation system electrical components shall be U.L. listed or of equivalent specifications.

As a minimum, all plastic vent pipes in mitigation systems shall be made of Schedule 40 PVC, ABS or equivalent piping material. Schedule 40 piping or its equivalent should be used in garages and in other internal and external location subject to weathering or physical damage.

Sump pit covers shall be made of durable plastic or other rigid material and designed to permit airtight sealing such as Vacu Ray and Drinjer Type covers or equal. To permit easy removal for sump pump servicing, the cover shall be sealed using silicone or other non-permanent type caulking materials or an airtight gasket recommended by manufacturer.

Penetrations of sump covers to accommodate electrical wiring, water ejection pipes, or radon vent pipes shall be designed to permit airtight sealing around penetrations, using caulk or grommets. Sump covers that permit observation of conditions in the sump pit are recommended.

Plastic sheeting installed in crawlspaces as soil-gas retarders shall be a minimum of 6 mil (3mil cross-laminated) polyethylene or equivalent flexible material. Heavier gauge sheeting will be used when crawlspaces are used for storage, or frequent entry is required for maintenance of utilities.

Any wood used in attaching soil-gas retarder membranes to crawlspace wall or piers will be pressure treated or naturally resistant to decays and termites.

6. Monitors & Labeling

All active soil depressurization and block wall depressurization radon mitigation systems will include a mechanism to monitor system performance and warn of system failure. The mechanism shall be simple to read or interpret and be located where it is easily seen or heard by building occupants and protected from damage or destruction. U-Tube type manometer-VacuRay Vacumeter or equal.

Mechanical radon mitigation system monitors, such as manometer type pressure gauges, will be clearly marked to indicate the range or zone of pressure readings that existed when the system was initially activated.

A system description label will be placed on the mitigation system, the electric service entrance panel, or other prominent location. This label will be legible from a distance of at least three feet and include the following information: "Radon Reduction System," my name, phone number, and RCP Identification Number, the date of installation, and an advisory that the building should be tested for radon at least two years or as required or recommended by state or local agencies. In addition, all exposed and visible interior radon mitigation system vent pipe sections shall be identified with at least one label on each floor level. The label shall read, "Radon Reduction System."

The circuit breakers controlling the circuits on which the radon vent fan and system failure warning devices operate will be labeled "Radon System."

All equipment used will meet or exceed EPA protocol. Name brands used will depend on availability, quality and price.

7. Post Mitigation Testing

After installation of an active radon control system (e.g., SSD) I will re-examine and verify the integrity of the fan mounting seals and all joints in the interior vent piping.

After installation of any active radon mitigation system I will check flows in system piping or ducting to assure that the system is operating as designed.

Immediately after installation and activation of any active (fan-powered) subslab depressurization or block wall depressurization system in buildings containing

natural draft combustion appliances, the building shall be tested for backdrafting of those appliances using a Retrotec Smoke Puffer or equal device.

Upon completion of radon mitigation work, a test of mitigation's system effectiveness shall be conducted. This test will be conducted no sooner than 24 hours nor later than 30 days following completion and activation of the mitigation system. This test may be conducted by the client, or by a third party testing firm.

To ensure continued effectiveness of the radon mitigation system installed, I will advise the client to retest the building at least every two years or as required or recommended by state or local authority. Retesting is also recommended if the building undergoes significant alteration.

8. Contracts, Documentation and Records

I will provide the client with the following written information prior to initiation of work:

1. My RCP Program identification number.
2. A statement that describes the planned scope of the work and that includes an estimate of the time needed to complete the work.
3. A statement describing any known hazards associated with chemicals use in or as part of the installation.
4. A statement indicating compliance with and implementation of all EPA standards and those of other agencies having jurisdiction (e.g., code requirements).
5. A statement describing any system maintenance that the building owner would be required to perform.
6. An estimate of the installation cost and annual operating costs of the system.
7. The conditions of any warranty or guarantee.

I will keep records of all radon mitigation work performed and maintain those records for 5 years or for the period of any warranty or guarantee, whichever is longer. These records will include and be available to the Iowa Department of Public Health:

1. The Building Investigation Summary and floor plan sketch.
2. Pre- and post-mitigation radon test data.
3. Pre- and post-mitigation diagnostic test data.
4. Copies of contracts and warranties.
5. A narrative or pictorial description of mitigation system installed.
6. Obtain required continuing education required to maintain Iowa certification.

Upon completion of the mitigation project, I will provide clients with an information package that includes:

1. Any building permits required by local codes.
2. Copies of the Building Investigation Summary and floor plan sketch.

3. Pre- and post-mitigation radon test data.
4. Copies of contracts and warranties.
5. A description of the mitigation system installed and its basic operating principles.
6. A description of any deviations from the RMS or State requirements.
7. A description of the proper operating procedures of any mechanical or electrical systems installed, including manufacturer's operation and maintenance instructions and warranties.
8. A list of appropriate actions for clients to take if the system failure-warning device indicates system degradation or failure.
9. My name, telephone number, and RCP Identification number and the phone number of the state radon office.

I do hereby agree to perform all mitigation projects for our clients in accordance with this QAP and SOP: on this _____ day of _____, _____.

(Date) (Month) (Year)

Signed by _____ Dated _____

I shall follow all EPA guidelines and mitigation protocols under EPA 402-R-93-078 10/93 (revised 4/94).

Signature: _____
 Title: Owner _____
 Date: _____

MITIGATION

1. Diagnostics

The following diagnostic will be performed for each mitigation.

- Visual survey of radon entry points and driving forces
- Indoor ambient radon measurements using a continuous radon monitor
- Sub-slab communication measurements
- Record results including name of tester

2. Mitigation materials will include readily available schedule 40 pvc. All materials will meet EPA and State of Iowa requirements.

3. Mitigation Methods

_____ will use only approved mitigation methods. Most common will be sub slab depressurization, and sub membrane depressurization. Other approved methods will be used when appropriate.

4. Other Services

_____ provides the following services:

- Pre- and post-mitigation radon measurements
- Water radon measurement
- Soil radon measurement

5. Records

The following records will be kept for a minimum of five years:

- Address of location of the building
- Name and phone number of the building owner(s) where the radon mitigation is conducted.
- A written description of each mitigation system and materials installed, diagnostic test results and cost of each system.
- The name of the certified radon measurement specialist or technician used to perform radon or radon progeny testing before and after radon mitigation of the building.
- The results of any initial or follow-up radon or radon progeny measurements performed and the measurement methods utilized.
- The results of the post-mitigation radon measurements performed, including method of measurement and all pertinent dates.

(Date)

STATEMENT OF CONFORMANCE TO STANDARDS

_____ agrees to conduct business in accordance with the protocols established by the U.S. EPA and the quality assurance and quality control guidelines described therein, in addition to local building codes and ordinances:

- Indoor Radon and Radon Decay Product Measurement Device Protocols, EPA 402-R-92-004, July 1992
- Protocols for Radon and Radon Decay Product Measurements in Homes, EPA 402-R-92-003, June 1993
- Radon Mitigation Standards, EPA 402-R-93-078, October 1993 (Revised April 1994)
- Guidance of Quality Assurance, EPA 402-R-95-012, October 1997

(Date)

RADIOLOGICAL SAFETY PLAN and MITIGATION “SOP” GUIDELINES

for

MONITORING WORKER RADON EXPOSURE

by

APPROVED:

President: _____ Date: _____

QA/QC Manager: _____ Date: _____

1.0 PURPOSE

The intended purpose of our Radiological Safety Plan for Monitoring Worker Radon Exposure is to provide a working environment of all _____ employees, both present and future, which is in compliance with the limits established by the Nuclear Regulatory Commission and regulated by OSHA.

2.0 PRINCIPLE RESPIRATORY CONSIDERATIONS

The as low as reasonably achievable principle is followed in consideration with all work practices and procedures during any radon related activities. Diagnostics and/or follow-up radon testing is often performed in homes suspected of having elevated radon concentrations. Testing devices are to be deployed and retrieved spending a minimum amount of time in the lower areas (basements, etc.), while still obtaining the needed information (floor layout, HVAC description, etc.). Recording of data and any discussions with homeowner or others should be conducted in areas less likely to have elevated radon concentrations.

Workers performing diagnostics/applications must participate in _____ employee monitoring program. Total dose records on individual personnel will be maintained on file at our offices. On-site monitoring data will be done with a CRM and exposure will be recorded from hard copy tapes. Workers will not be exposed to more than (4) WLM per year. Investigational level is set at 10% of the maximum exposure level.

The following formulas will be used to calculate exposure in WLM:

$$R_n = (WL * 100) / ER \quad (\text{An ER of 0.5 is commonly assumed as an average.})$$

$$WL = (R_n * ER) / 100$$

$$WLM = (WL * \text{exposure duration}) / 170$$

Worker Protection Plan Continued

_____ will comply with all OSHA, state and local standards or regulations relating to worker safety and occupational radon exposure.

I will advise workers of the hazards of exposure to radon and the need to apply protective measures when working in areas of elevated radon concentrations. Work area will be constantly monitored hourly using femto-Tech continuous monitor. (CRM510) or ATD devices. All calibrations and cross checks will be available and recorded on my chain of custody worksheet.

I will ensure that appropriate safety equipment such as hard hats, face shields, ear plugs, steel-toe boots and protective gloves are available on the job site during cutting, drilling, grinding, polishing, demolishing or other activity associated with radon mitigation projects.

All electrical equipment used during radon mitigation projects shall be properly grounded. Circuits used as a power source will be protected by GFCI.

When work is required at elevations above the ground or floor, I will ensure that ladders or scaffolding are safely installed and operated.

Work areas will be ventilated to reduce worker exposure to radon decay products, dust, or other airborne pollutants. If exposure reaches the OSHA standard of 4WLM for any employee, he or she will not be allowed to continue working. Employees shall wear respiratory protection when working in radon concentrations of 30pCi/L.

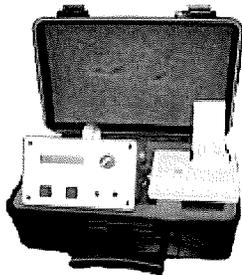
Pending development of approved personal radon exposure device and a protocol for its use, I will record employee exposure to radon at each work site, based on: 1) Highest pre-mitigation indoor radon level measurement available and 2) The time employees are exposed.

In any planned work area where it is suspected that friable asbestos may be disturbed, radon mitigation work shall not be conducted until a determination is made by a properly trained or accredited person that such work will be undertaken in a manner which complies with applicable asbestos regulations.

Signed _____
(Owner)

Dated _____.

SUPPLIES FOR RADON MITIGATION



femto-TECH is Proud to
**Introduce the
NEW CRM-510LP**

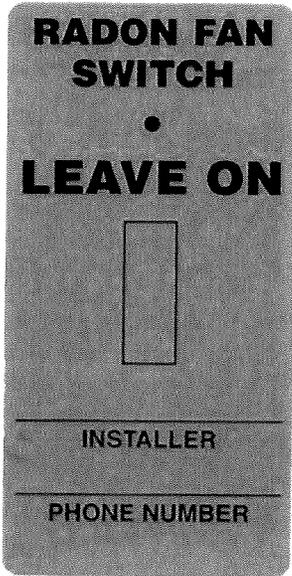
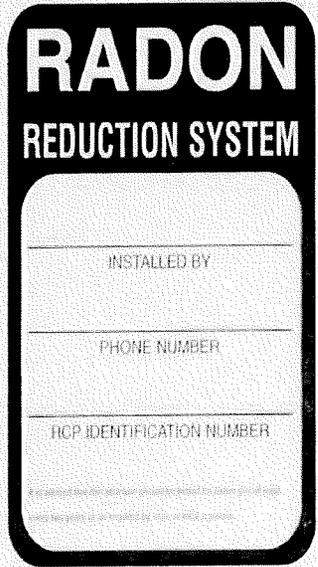
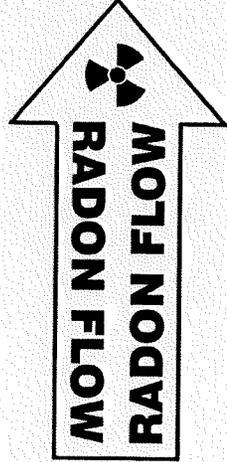
Precision Airborne Alpha Radiation Detection Instrument

The Femto-Tech, Inc. model CRM-510LP is a precision airborne alpha radiation detection instrument based on the same field proven pulsed ion chamber technology of previous models R210F and RS410F. Due to a unique patented electrometer and open grid probe design, the model CRM-510LP is highly suited for a wide range of radon measurement applications. Because of the low current requirements of the electrometer detector and on-board computer, the model CRM-510LP is truly a portable self-contained continuous radon monitor that can read and store test data for eight days of stand-alone operation. In this "passive" mode of operation the model CRM-510LP is uniquely suited for screening and follow-up type testing.

The full function computer system incorporated in the model CRM-510LP provides the operator with a highly flexible radon detection instrument and data logger operating system, while still maintaining the simplicity of operation for which Femto-Tech instruments are noted. In addition to the measurement and storage of radon data, the highly sophisticated on-chip peripheral capabilities of the micro controller (MCU) used in the CRM-510LP provide for the measurement and storage of temperature, barometric pressure, and relative humidity. This multidimensional data acquisition capability provides the tester with a unique data base for evaluating the validity of short term radon measurements.

CRM-510LP Specifications

Radiation Detected:	Radon-222 Alpha
Detector:	Air Ionization Probe
Dynamic Range:	0.5 to 2000 pCi/l (18 to 74000 Bq/m ³)
Units:	pCi/l or Bq/m ³
Sensitivity:	0.3 CPM Per pCi/l (Nominal) (0.008 CPM Per Bq/m ³)
Linearity:	0.5 to 2000 pCi/l (<10% Deviation)
Sampling Mode:	Passive Air Diffusion
Data Collection	Elapse Time Displayed
Data Printing	ASCII text Data, Seiko/Epson® Graphics Data
Data Storage:	192 One Hour Data Points (8 Days)
Temperature	Range 50-104 °F (10-40 °C) Sensitivity ± 1 °F (± 0.5 °C)
Barometric Pressure	Range 0-38 "Hg (0-127 kPa) Sensitivity ± 0.2 "Hg (± 0.5 kPa)
Relative Humidity	Range 10-90% Sensitivity ± 5%
Alphanumeric Prompts	16-Digit one Line LCD
Low Battery Indicator	LCD Message
Pulse Indicator	Red LCD
Key Switch	Off, I/O, and Run Positions
Two Momentary Push Buttons	Multifunction Select & Execute
Serial	RS-232C
Parallel	8 Bit Simplified Centronics
Electrometer	Four 9 V Alkaline (Nominal Life 1 Yr.)
Computer/Data Logger	7.2 V, 7.2 Ah Lithium (Nominal Life 1 Yr.)
Height (w/handle)	5.4" (137 mm)
Width	6.6" (160 mm)
Depth	7.4" (190 mm)
Weight	3.9 pounds (1.8 Kg)
Environmental Operating Range	50-104 °F (10-40 °C)
Noncondensing	10 to 90% RH noncondensing

<p>... Labels ...</p>		
		
<p>System Component Label</p>		<p>Tamper Proof Label</p>
		
<p>Switch Label</p>	<p>Contractor Label</p>	<p>Air Flow Label</p>



... Manometers ...

VM2 Manometer

Product# VM2

The best value vacuum indicator on the market. Highly visible and measures up to 4" water column differential.

The scale is accurately calibrated for the specific gravity of the fluid. It arrives to you pre-filled. The scale is adjustable; no more over or under filled manometers.

The fluid contained within is non-toxic, ideal for residential installations. Fluid is non-evaporating. Unit comes with radon label that is required by many townships and municipalities.



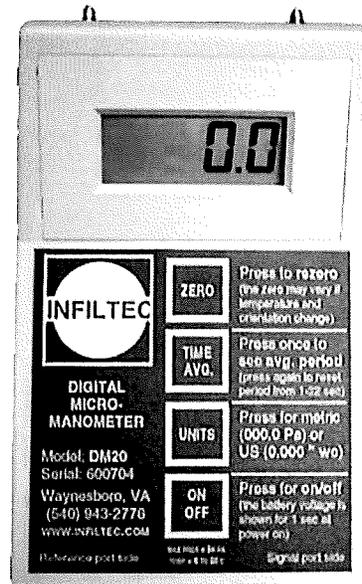
Infiltec Manometer

Product# MA2

This compact hand held digital manometer is an ideal test instrument for low differential pressure measurement applications.

Accurately measures up to 2.0 inches of water column in .01 inch increments. Use this cost effective instrument to measure the effects of sealing, determine if all sub-slab points are negatively pressurized and help to ensure an effective mitigation.

A "must have" for the radon professional.



... Caulk ...

Pecora Brand Caulk

Dynatrol I-XL

Product# DYNATROL

One part, non sag polyurethane rubber sealant with the cured characteristics of a two part.
10 ounce tubes available in cases of 30



NR-201 Urexpan

Product# NR201

One part, self leveling and moisture curing polyethylene sealant.

Use with our backer rod to save on NR-201.

30 ounce tubes available in cases of 10

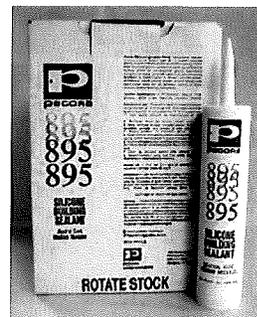


Silicone #895

Product# SILIC

One part, low-modulus architectural silicone with high elongation and compression recovery. Recommended for masonry expansion and control joints. Neutral cure bonds to concrete better than other silicones.

10 ounce tubes available in cases of 12



... Fan Accessories ...

Custom Couplings

Product# EZWC3X3

Our custom 3 inch couplings specially processed for easy use with Fantech HP190 and HP175 fans

Product# WC3X3

Use with Radonaway GP series and 3 inch pipe

Product# WC4X3

Use with Radonaway XP series and 3 inch pipe or GP series and 4 inch pipe

Product# WC4X4

Use with Radonaway XP series and 4 Inch pipe

Product# WC4X5

Use with Fantech HP190 or HP175 and 4 inch pipe

Product# WC4X6

Use with Fantech HP190 or HP175 and 4 inch pipe or Radonaway XR series and 4 inch pipe

Line Cord

Product# LINEC

These high quality six foot line cords are three-prong with 18 gauge wire and are designed to fit standard household outlets.

Our line cords are recommended for indoor use only.

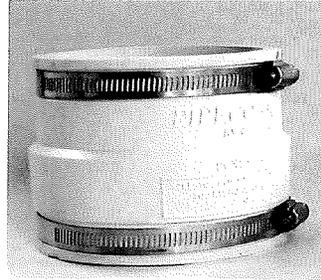
System Noise Suppressor

Product# SNS

Effectively quiets any noticeable noises generated by a radon reduction system.

Fits directly onto 4 inch PVC pipe or can be inserted directly into the rubber coupling at the fan to make a quick and easy installation.

Approximately 75% noise reduction with no back pressure.



... Fans ...

HP Series

Product# HP175

Compact and inexpensive.

Works well where low suction is required
NOT A STOCK ITEM. SPECIAL ORDER

Product# HP190

Same powerful motor as the FR150,
but in a more compact housing for use
where installation clearance is a consideration

Product# HP220

Use where high performance and air flow are needed

Product# HP2133

Made for low pressure applications
Record low power consumption

Product# HP2190

Performance comparable to the HP190 in a new
housing

FR Series

Product# FR150

Long an industry standard for most applications.
Excellent general duty fan

Product# FR160

Same housing as the FR150 with a more powerful
motor

Product# FR100

Useful where minimal airflow is required

Product# FR200

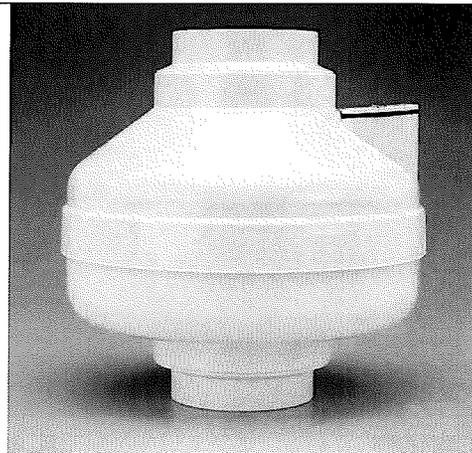
Use where extreme airflow is needed
NOT A STOCK ITEM. SPECIAL ORDER

Product# FR225

Use where more extreme airflow is needed
NOT A STOCK ITEM. SPECIAL ORDER

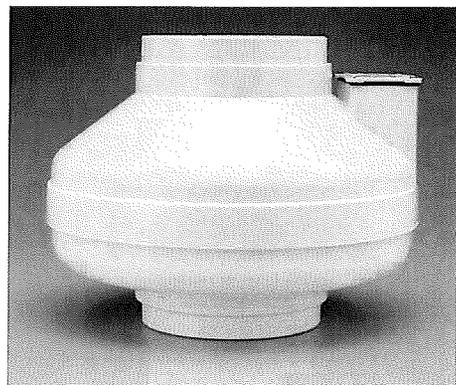
Product# FR250

Use where the most extreme airflow is needed
NOT A STOCK ITEM. SPECIAL ORDER



HP Series

These fans are tested to meet UL
standard 507 for indoor or outdoor use and
meet all electrical code requirements.
Defective Fantech Fans must be shipped
direct to Fantech per their recommendation.
Please call us at 888-800-5955
for an RMA number.



FR Series

GP Series

The GP series has a range of performance that makes them suitable for virtually all sub-slab materials.

Product# GP201

45-60 watts - 2.0 inches maximum pressure

Product# GP301

55-90 watts - 2.6 inches maximum pressure

Product# GP401

60-120 watts - 3.4 inches maximum pressure

Product# GP501

60-140 watts - 4.2 inches maximum pressure

RP Series

Designed especially for radon mitigation, RP Series Fans provide superb performance, run ultra quiet and are attractive. They are an ideal choice for most sub-slab radon mitigation systems.

Product# RP145

37-71 watts - 2.1 inches maximum pressure

Product# RP260

52-72 watts - 1.8 inches maximum pressure

Product# RP265

86-140 watts - 2.5 inches maximum pressure

XP Series

Similar to the XR series, but with the added benefit of low power usage.

Product# XP151

45-60 watts - 1.6 inches maximum pressure
180 cfm at 0 inches of static pressure

Product# XP201

45-65 watts - 2.0 inches maximum pressure
150 cfm at 0 inches of static pressure

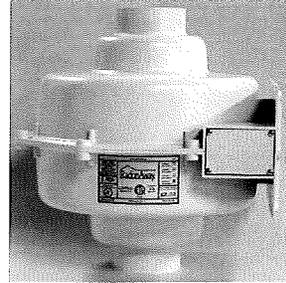
XR Series

Comparable to the XR161 however, the XR261 has more open airflow.

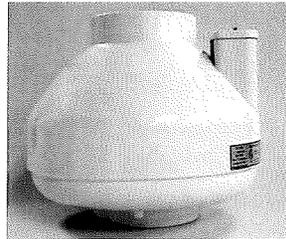
Product# XR261

65-105 watts - 1.8 inches maximum pressure
250 cfm at 0 inches of static pressure

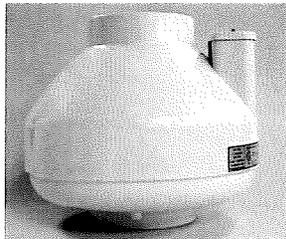
GP Series



RP Series



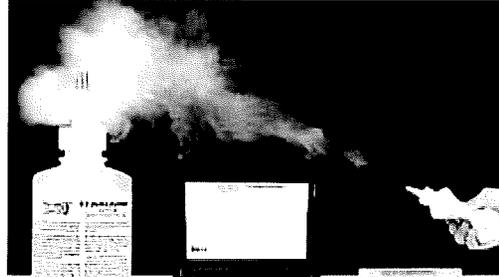
XP Series



XR Series

... Smoke Generators ...

Tel-Tru™ T-T Dura-Puffer™ produces puffs of smoke on demand for environmental air motion studies. **Dura-Puffer** offers many of the features of both the classic T-T Smoke Stick and the T-T Smoke Gun combined in a reusable, unbreakable Teflon* dispenser body, which, like glass, is virtually impervious to titanium tetrachloride.



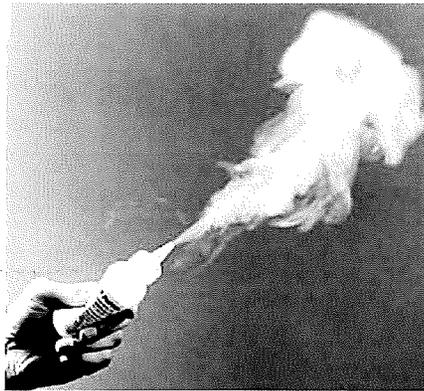
#15-080 Tel-Tru™ T-T Dura-Puffer

The **Dura-Puffer** body is 2-3/8" in diameter by 5-1/4" high and is filled with cotton. Replaceable screw-on plastic dispenser spouts add 1-3/8 inches to the height. Note that with use, the plastic dispenser spouts will decay and must be replaced. Two are supplied with each **Dura-Puffer** kit. A flat Teflon* screw-on cap is also supplied for long term storage of unused smoke between application.

To use the **Dura-Puffer**, load the contents of a refill vial into the dispenser body and screw-on a dispenser spout. Titanium tetrachloride combines with atmospheric moisture to form dense, persistent smoke. Smoke is emitted in discrete puffs or in a long stream - depending on how the dispenser body is squeezed.

Each refill vial provides from 250 to 500 or more puffs of smoke. The #15-080 kit includes the **Dura-Puffer**, four refill vials, a storage cap, two dispenser spouts and instructions contained in a handy high-impact plastic carrying case.

Tel-Tru™ T-T Puffer™ produces puffs of smoke on demand for environmental air motion studies. **Puffer** offers many of the features of both the classic T-T Smoke Stick and T-T Smoke Gun combined.



#15-110 and #15-120 Tel-Tru™ T-T Puffer

After activation, each **T-T Puffer** generates from 100 to 200 or more puffs of highly visible, long lasting white smoke. To use **Puffer**, simply point and squeeze.

The **T-T Puffer** consists of a disposable flexible plastic dispenser with a small glass vial of titanium tetrachloride inside. The vial is cushioned to help prevent breakage until ready to use. Shelf life of a **T-T Puffer** before being activated is indefinite (with proper storage.)

Tel-Tru™ T-T Smoke Sticks are one of the most convenient and widely used small volume tracer smoke sources. The Sticks utilize titanium tetrachloride which combines with atmospheric moisture to form a dense, persistent white smoke. To use, simply hold the Smoke Stick vertically and crush the end of the cotton swab with pliers. This produces a continuous stream of smoke, about three to four times as much as from a cigarette, for about ten minutes.

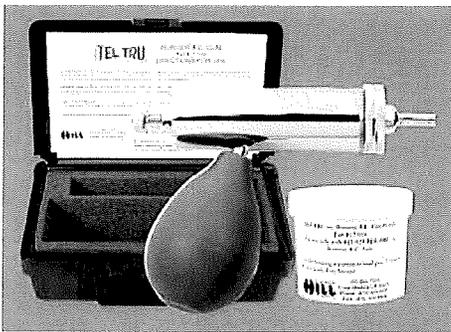


#15-049 Tel-Tru™ Smoke

... Smoke Gun ...

Tel-Tru™ T-T Smoke Guns have been widely used for more than sixty years. They utilize titanium tetrachloride which combines with atmospheric moisture to form a dense, persistent white smoke. **T-T Smoke Guns** provide smoke on demand by simply squeezing the rubber bulb handle. This can produce either discrete puffs or a continuous stream. Each reload vial produces 250 to 500 puffs of smoke. Four refill vials are supplied with each gun.

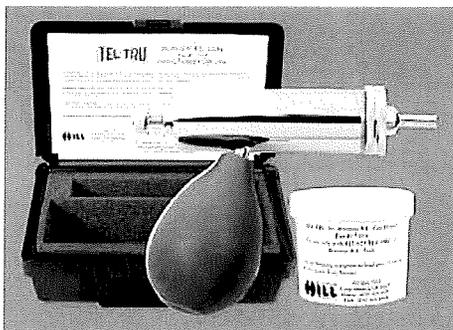
A breech plug on the unique hand-blown glass body opens easily for refilling. After use, unused chemical in the gun is preserved by capping the gun barrel. Sealed glass refill vials can be stored indefinitely. The rugged plastic carrying case is 9.5" x 6.5" x 3.5".



Tel-Tru™ Borozin Powder "Smoke" Gun emits dense white clouds of very fine powder "smoke" with each squeeze of the rubber bulb handle. A precision machined valve regulates the amount of powder emitted and closes the barrel entirely when not in use. The **Borozin Gun** is recommended for applications where the slight acidity of the T-T smoke is undesirable.

Borozin Guns are very useful for locating leaks in small pressure vessels. For example, when the "smoke" is emitted near a suspected window seal leak inside an automobile - with the fan turned on to create a positive pressure - escaping air will leave a slight tell-tale powder streak on the outside pointing to the leak.

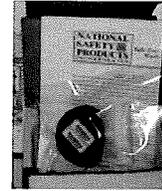
The Gun body is finely machine solid brass, chrome plated and polished. It is 1.5" in diameter by 4" long; 5.25" long including the barrel. Plastic carrying case is 9.5" x 6.5" x 3.0".



... Radon Tests ...

Alpha Track Detector

The long term detector is a diffusion-based track detector originally designed in 1986. The current improved design filters out dust and radon progeny through a structural filter that is an integral part of the housing, resulting in increased sturdiness. The housing is injection molded from electrically conducting plastic in order to minimize electrical charge effects from the positively charged radon progeny generated inside the detector. The hemispherical base is designed to maximize sensitivity and create a more uniform track distribution for better counting statistics.



Open Face Charcoal Canisters

The open face charcoal canister is calibrated for a two to five day exposure with a recommended exposure of two to three days. Humidity effects are controlled by correcting for moisture gain during analysis.



