C-NRPP Fan Specification Review

CNRPP-RS-DF-v3a

January 2017

Background

Radon

Radon is a colourless, tasteless, odourless, naturally occurring radioactive gas released from the breakdown of uranium in soil. Radon gas exists in a low concentration in the atmosphere, but it becomes of concern when the gas leaks into a home and is allowed to accumulate to high concentrations. Exposure to high levels of radon for a prolonged period of time increases one's chances of developing lung cancer; radon exposure is the number one environmental cause of lung cancer, and the second leading cause only behind smoking tobacco. According to Health Canada, approximately 3,200 cases or 16% of all cases of lung cancer can be attributed to radon exposure in Canada.

Mitigation

If elevated radon level concentrations are found within a home, a radon mitigation system may be installed to lower the levels to a safer level. This is typically carried out by the installation of an *Active Slab Depressurisation System* installed by a C-NRPP Certified Mitigation Professional. The Active Slab Depressurisation (ASD) system consists of a pipe extending from below the slab or membrane, up through interior where it connects to a fan, then terminates outside into the atmosphere. This method of radon mitigation, if properly installed, creates a negative pressure below the slab and/or membrane thus drawing the soil gases out through the installed system and into the atmosphere rather then allowing them to move from the soil space beneath the building, entering into the building envelope.

Canadian Reference Documents for Radon Mitigation Systems

Health Canada in conjunction with stakeholders from the housing industry has developed the *Canadian Guide for Professional Contractors: Reducing Radon Levels in Existing Homes*. This guide is aimed at providing professional building contractors with information on radon mitigation techniques for existing homes in contact with the soil. The guide includes both techniques for radon mitigation as well as equipment to be used in a mitigation system. The guide serves as the first guidance for radon mitigation installations in Canada.

The Canadian General Standards Board (CGSB) has developed two standards for use in Canada. CAN/CGSB-149.12-2015 CD-01 is for Radon Mitigation options for existing low rise residential buildings; CAN/CGSB-149.11-2015 CD-01: Radon control options for new construction in low rise residential dwellings. These standards were developed in conjunction with Health Canada and a committee which included a number of C-NRPP certified professionals to provide a standard for use in Canada for the installation of radon

mitigation systems in existing buildings and radon control options in new construction. As of the time of this research these are both in currently in draft, undergoing revisions.

The American National Standards Institute (ANSI) has developed ANSI/AARST RMS-LB 2014. This is currently the standard reference for radon mitigation of schools and large buildings in Canada. ANSI/AARST RMS-LB 2014 was developed by AARST Consortium on National Radon Standards in accordance with requirements of ANSI standards. The standards provide specific practices, minimum requirements and general guidance for mitigation of radon in existing schools and large buildings including both low-rise and high-rise schools and large buildings.

These four documents provide mitigation professionals in Canada with information on installing radon mitigation systems, including specifications for equipment to be used in a system, such as the fan, pipe, couplers, etc.

Purpose

As the radon mitigation industry in Canada grows, it is important that professionals entering the field have access to accurate information and specifications on the products that they will be installing.

The goal of this project was to compile a list of the commercially available radon mitigation fans and compare their specifications against the standards set forth in the four documents previously described, *Canadian Guide for Professional Contractors: Reducing Radon Levels in Existing Homes*, ANSI/AARST RMS-LB 2014, CAN/CGSB-149.11-2015, and CAN/CGSB-149.12-2015 CD-01. This compiled information will be of aid to professional radon mitigators, which will allow them to see a complete listing of the commercially available radon mitigation fans in Canada and comparison to the requirements listed in the Canadian mitigation reference documents. In addition to this, the list will serve as a communication tool to fan manufacturers of the Canadian fan requirements which could be used by them in developing documents which they use to market their fans to Canadian professional mitigators, and also to policy makers, to help in determining which mitigation fans are available when adopting standards.

The list will also provide Canadians with clear, factual information pertaining to the fans being installed into their homes and a comparison with the Canadian mitigation reference documents. This is important part of developing Canadian consumer confidence in a new Radon Mitigation Industry.

C-NRPP will attempt to maintain the list by annually updating the list with accurate information once new radon mitigation fans are available within the Canadian market or established documents are created or modified.

Method

The specifications set forth in *Canadian Guide for Professional Contractors: Reducing Radon Levels in Existing Homes*, ANSI/AARST RMS-LB 2014, CAN/CGSB-149.11-2015, and CAN/CGSB-149.12-2015 CD-01 were compiled and formatted into a list. Each fan was evaluated based on information available on manufacturers websites as well as fan specification sheets. If the specification from our list was clearly state on their website it was noted on our list. Additionally, if the information was not listed, an email was sent out directly to the manufacture requesting the information. Resulting information provided by the manufacturers has also been included in the list. C-NRPP depended on the manufacturers to provide accurate information on their own manufactured fans.

Since in Canada, fans can be installed inside the building envelope but there are fans available which are limited to an exterior installation, the list has been divided to separate those fans which are for exterior installation only.

The method of collecting information was meant to mimic the process a mitigator would have access to follow in evaluating a fan for installation.

The four resources; *Canadian Guide for Professional Contractors: Reducing Radon Levels in Existing Homes*, ANSI/AARST RMS-LB 2014, CAN/CGSB-149.11-2015, and CAN/CGSB-149.12-2015 CD-01 were chosen because they are the four standards available which come from sources/institutions that are widely used across various industries in Canada.

The list of fan manufacturers was based on input from current mitigation professionals and known sources for radon mitigation fans. If there are other fans available in Canada not on the current list, C-NRPP is willing to add to the list as part of the annual update.

Standard	Requirement	Fantech							Festa AMG									
		FR150(Radon)	HP175	HP190	HP190SL - discontinued	HP2133	HP2190	HP220	Eagle	Force	Fury	Fury II	Hawk	Legend	Maverick	Patriot	Prowler	Spirit
CDN Guide for Professional Contractors	9.3: In-line centrifugal fan specifically designed for radon mitigation				(e)													
	9.3: Fan has sealed airtight joints																	
	9.3: Fan allows for vertical installation, so that any condensation will drain through the fan, rather than pooling the casing.				(e)													
	9.3: Electrical connections are located on the suction side of the fan																	
	9.3: Fan is designed to be connected to the piping with airtight rubber plumbing couplers																	
	9.4: Electrical components are CSA or UL listed or equivalent	(2)'																
	9.4: If fan designed to be mounted exteriorly, it has provisions to be hardwired to an internal junction box																	
CGSB-149.12-2015	4.1.4.2 In-line centrifugal fan specifically designed for radon mitigation				(e)													
	4.1.4.2: Meets safety requirements in accordance with CSA-C22.2 No. 113	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)'	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)
	4.1.4.2: Motor complies with applicable requirements of CSA-C22.2 No. 100 for motors having 100% duty cycle.	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)
	4.1.4.2: Fan seams and enclosure openings other than inlet and outlet ports are sealed and any openings or gaps do not exceed a total area of a single [3.17mm] 0.125” diameter hole.	(e)	(e)	(e)	(e)	(e)	(e)	(e)										
	4.1.4.4: Fan uses rubber (flexible) couplings to connect to piping.																	
	4.1.5.1: Fan is either doubly insulated or grounded. And electrical components are CSA or UL listed.																	
	7.3.2.1.1: Rated for continuous duty operation.																	
	7.3.2.2: Minimum 3-year warranty against factory defect.		(1)'		(1)'													
ANSI/AARST RMS-LB 2014	7.5: Fan is designed or otherwise sealed to reduce the potential for leakage of water or soil gas from the fan housing.																	
	7.5: Designed to accommodate continuous																	
	7.5: Designed to minimize objectionable noise.																	
	7.5: Fan originates from a manufacture that lists ASD (radon mitigation) as one of the fan’s intended uses.																	
	7.5.6: Flexible Couplings Required at ASD Fan																	

Standard	Requirement	Obar GBR		RadonAway																	
		GBR45XL	GBR45	GP201	GP301	GP401	GP500	GP501	HS2000	HS2000E	HS3000E	HS5000	HS5000E	RP140	RP145	RP260	RP265	RP380	XP151	XP201	XR261
CDN Guide for Professional Contractors	9.3: In-line centrifugal fan specifically designed for radon mitigation						(e)		(e)	(e)	(e)	(e)	(e)								
	9.3: Fan has sealed airtight joints																				
	9.3: Fan allows for vertical installation, so that any condensation will drain through the fan, rather than pooling the casing.						(e)		(e)	(e)	(e)	(e)	(e)								
	9.3: Electrical connections are located on the suction side of the fan			(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)								
	9.3: Fan is designed to be connected to the piping with airtight rubber plumbing couplers																				
	9.4: Electrical components are CSA or UL listed or equivalent																				
	9.4: If fan designed to be mounted exteriorly, it has provisions to be hardwired to an internal junction box																				
CGSB-149.12-2015	4.1.4.2 In-line centrifugal fan specifically designed for radon mitigation						(e)		(e)	(e)	(e)	(e)	(e)								
	4.1.4.2: Meets safety requirements in accordance with CSA-C22.2 No. 113																				
	4.1.4.2: Motor complies with applicable requirements of CSA-C22.2 No. 100 for motors having 100% duty cycle.			(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)
	4.1.4.2: Fan seams and enclosure openings other than inlet and outlet ports are sealed and any openings or gaps do not exceed a total area of a single [3.17mm] 0.125” diameter hole.			(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)	(e)
	4.1.4.4: Fan uses rubber (flexible) couplings to connect to piping.																				
	4.1.5.1: Fan is either doubly insulated or grounded. And electrical components are CSA or UL listed.																				
	7.3.2.1.1: Rated for continuous duty operation.																				
	7.3.2.2: Minimum 3-year warranty against factory defect.																				
ANSI/AARST RMS-LB 2014	7.5: Fan is designed or otherwise sealed to reduce the potential for leakage of water or soil gas from the fan housing.																				
	7.5: Designed to accommodate continuous																				
	7.5: Designed to minimize objectionable noise.																				
	7.5: Fan originates from a manufacture that lists ASD (radon mitigation) as one of the fan’s intended uses.																				
	7.5.6: Flexible Couplings Required at ASD Fan																				

Standard	Requirement	SunCourt		Tjernlund										
		RDN04	RDK04	PVC4 Booster Fan	Radon Vac RMS160	R3HF	R4HF	R5HF	R3LW	R5LW	R3HS	R6C	R4B	R4BC
CDN Guide for Professional Contractors	9.3: In-line centrifugal fan specifically designed for radon mitigation													
	9.3: Fan has sealed airtight joints													
	9.3: Fan allows for vertical installation, so that any condensation will drain through the fan, rather than pooling the casing.													
	9.3: Electrical connections are located on the suction side of the fan													
	9.3: Fan is designed to be connected to the piping with airtight rubber plumbing couplers													
	9.4: Electrical components are CSA or UL listed or equivalent													
	9.4: If fan designed to be mounted exteriorly, it has provisions to be hardwired to an internal junction box													
CGSB-149.12-2015	4.1.4.2 In-line centrifugal fan specifically designed for radon mitigation													
	4.1.4.2: Meets safety requirements in accordance with CSA-C22.2 No. 113													
	4.1.4.2: Motor complies with applicable requirements of CSA-C22.2 No. 100 for motors having 100% duty cycle.													
	4.1.4.2: Fan seams and enclosure openings other than inlet and outlet ports are sealed and any openings or gaps do not exceed a total area of a single [3.17mm] 0.125” diameter hole.													
	4.1.4.4: Fan uses rubber (flexible) couplings to connect to piping.													
	4.1.5.1: Fan is either doubly insulated or grounded. And electrical components are CSA or UL listed.													
	7.3.2.1.1: Rated for continuous duty operation.													
	7.3.2.2: Minimum 3-year warranty against factory defect.													
ANSI/AARST RMS-LB 2014	7.5: Fan is designed or otherwise sealed to reduce the potential for leakage of water or soil gas from the fan housing.													
	7.5: Designed to accommodate continuous													
	7.5: Designed to minimize objectionable noise.													
	7.5: Fan originates from a manufacture that lists ASD (radon mitigation) as one of the fan’s intended uses.													
	7.5.6: Flexible Couplings Required at ASD Fan													

Standard	Requirement	Fantech	RadonAway	Obar			
		HP190SLQ	SF180	GBR76 HO	GBR76 UD	GBR76 SOE	GBR89 HA&MA
CDN Guide for Professional Contractors	9.3: In-line centrifugal fan specifically designed for radon mitigation	(e)	(e)				
	9.3: Fan has sealed airtight joints						
	9.3: Fan allows for vertical installation, so that any condensation will drain through the fan, rather than pooling the casing.	(e)	(e)				
	9.3: Electrical connections are located on the suction side of the fan						
	9.3: Fan is designed to be connected to the piping with airtight rubber plumbing couplers						
	9.4: Electrical components are CSA or UL listed or equivalent						
	9.4: If fan designed to be mounted exteriorly, it has provisions to be hardwired to an internal junction box						
CGSB-149.12-2015	4.1.4.2 In-line centrifugal fan specifically designed for radon mitigation	(e)	(e)				
	4.1.4.2: Meets safety requirements in accordance with CSA-C22.2 No. 113	(e)					
	4.1.4.2: Motor complies with applicable requirements of CSA-C22.2 No. 100 for motors having 100% duty cycle.	(e)	(e)				
	4.1.4.2: Fan seams and enclosure openings other than inlet and outlet ports are sealed and any openings or gaps do not exceed a total area of a single [3.17mm] 0.125” diameter hole.	(e)	(e)				
	4.1.4.4: Fan uses rubber (flexible) couplings to connect to piping.						
	4.1.5.1: Fan is either doubly insulated or grounded. And electrical components are CSA or UL listed.						
	7.3.2.1.1: Rated for continuous duty operation.						
	7.3.2.2: Minimum 3-year warranty against factory defect.						
ANSI/AARST RMS-LB 2014	7.5: Fan is designed or otherwise sealed to reduce the potential for leakage of water or soil gas from the fan housing.						
	7.5: Designed to accommodate continuous						
	7.5: Designed to minimize objectionable noise.						
	7.5: Fan originates from a manufacture that lists ASD (radon mitigation) as one of the fan’s intended uses.						
	7.5.6: Flexible Couplings Required at ASD Fan						

Information o | Inspection requi

Information via email (e)

Does not me

Not applicab

Notes: (1) Warranty voided if Condensate not used.

(2) UL plastic; HVI certified

Appendix 1 – References

Standards:

Health Canada: Reducing Radon Levels in Existing Homes: A Canadian Guide for Professional Contractors (www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radon_contractors-entrepreneurs/index-eng.php)

AARST Consortium on National Radon Standards; Radon Mitigation Standards for Schools and Large Buildings; ANSI/AARST RMS-LB 2014;

National Standards of Canada: Radon control options for new construction in low rise residential dwelling; CAN/CGSB-149.11-2015; ICS 91.040.30; 2015-07-10

National Standards of Canada: Radon mitigation options for existing low rise residential buildings; CAN/CGSB-149.12-2015 CD-01; ICS 91.120.99; 2016-08-2

Fan Specifications:

Fantech (Plus email)

http://www.fantech.net/FR150Radon6wo-Bracket_enus-45045.aspx
http://www.fantech.net/HP175Radon4wo-Bracket_enus-45047.aspx
http://www.fantech.net/HP190Radon4-wo-Bracket_enus-411297.aspx
http://www.fantech.net/HP190SLQ-RADON-FAN_enus-44664.aspx
http://www.fantech.net/HP2133Radonwo-Bracket_enus-45044.aspx
http://www.fantech.net/HP2190Radon4wo-Bracket_enus-45048.aspx
http://www.fantech.net/HP220Radon6wo-Bracket_enus-411349.aspx
http://www.fantech.net/Documents/Downloads/Leaflets/English/E1592%20Ventilation%20Solutions%20Radon.pdf

Festa (Plus email)

http://www.festaradontech.com/#!amg-maverick/emvvw
http://www.festaradontech.com/#!amg-legend/b670p
http://www.festaradontech.com/#!amg-hawk/ahv6p
http://www.festaradontech.com/#!amg-eagle/szk49

http://www.festaradontech.com/#!amg-prowler/zbaui
http://www.festaradontech.com/#!amg-fury/d5kkk
http://www.festaradontech.com/#!amg-fury-ii/bb4hg
http://www.festaradontech.com/#!amg-force/w2qdb
http://www.festaradontech.com/#!amg-patriot/s4lj1
http://www.festaradontech.com/#!amg-spirit/jqe5b
http://media.wix.com/ugd/6f00d6_124b02453bd445c6a163df738c7ec591.pdf

Obar GBR

http://www.obarsystems.com/product/gbr45/
http://www.obarsystems.com/product/gbr-45-xl/
http://www.obarsystems.com/product/gbr-76soe/
http://www.obarsystems.com/product/gbr-76ud/
http://www.obarsystems.com/product/gbr-89ha/

RadonAway (Plus email)

https://www.radonaway.com/pdfs/radon-fans/rp/radonaway-rp-instructions.pdf
http://www.radonaway.com/products/radon-fans/gp-series/gp201.php
http://www.radonaway.com/products/radon-fans/gp-series/gp301.php
http://www.radonaway.com/products/radon-fans/gp-series/gp401.php
http://www.radonaway.com/products/radon-fans/gp-500.php
http://www.radonaway.com/products/radon-fans/gp-series/gp501.php
http://www.radonaway.com/products/radon-fans/hs-series/hs2000-blower-w-cord.php
http://www.radonaway.com/products/radon-fans/hs-series/hs2000-blower-w-switch-box.php
http://www.radonaway.com/products/radon-fans/hs-series/hs3000-blower-w-cord.php
http://www.radonaway.com/products/radon-fans/hs-series/hs3000-blower-w-switch-box.php
http://www.radonaway.com/products/radon-fans/hs-series/hs5000-blower-w-cord.php
http://www.radonaway.com/products/radon-fans/hs-series/hs5000-blower-w-switch-box.php
http://www.radonaway.com/products/radon-fans/rp-series/rp140.php
http://www.radonaway.com/products/radon-fans/rp-series/rp145.php
http://www.radonaway.com/products/radon-fans/rp-series/rp260.php
http://www.radonaway.com/products/radon-fans/rp-series/rp265.php
http://www.radonaway.com/products/radon-fans/rp-series/rp380.php
http://www.radonaway.com/products/radon-fans/sf180/sf180.php
http://www.radonaway.com/products/radon-fans/xp-xr-series/xp151.php
http://www.radonaway.com/products/radon-fans/xp-xr-series/xp201.php
http://www.radonaway.com/products/radon-fans/xp-xr-series/xr261.php

SunCourt

http://www.suncourt.com/product/RDN04
http://www.suncourt.com/product/RDK04

Tjernlund

http://www.tjernlund.com/Tjernlund_RMS160_Radon_Vac_8500722.pdf
http://www.tjernlund.com/radonvac.htm