

C-NRPP

Canadian - National Radon Proficiency Program

Establishing Performance, Quality Assurance & Listing Criteria for Home Radon Alarms - A C-NRPP Initiative

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Abstract

- Early 2015, the Canadian Association of Radon Scientists & Technologists (CARST) technical committee developed a performance specification for Home Radon Alarms.



Abstract

This paper:

- summarizes Home Rn Alarm performance and “Type Test” requirements developed by CARST,
- details major sections of C-NRPP’s “Home Rn Alarm Listing Implementation & Review Manual,”



Abstract

- presents an overview of the C-NRPP listing process,
- provides requirements for the Manufacturer's QA Manual,
- discusses the documents each manufacturer has to submit to C-NRPP for review and approval.



What is a Radon Home Alarm?

- electronic, radon monitoring device,
- intended for homeowners to use,
- radon equivalent of a smoke detector,
- alarm condition indicates elevated radon in indoor air concentrations,
- **NOT** intended for professional Rn measurements, nor Rn mitigation decisions.



Contents of the Implementation Manual

- Introduction
- Scope
- Definitions
- References
- Specifications
- The Listing Process
- The Manufacturer's QA Manual
- SARA Documents
- The C-NRPP Audit



Some Definitions

- BOM,
- DSC or MDL,
- SARA (Document),
- TTU,
- Type Testing.



References

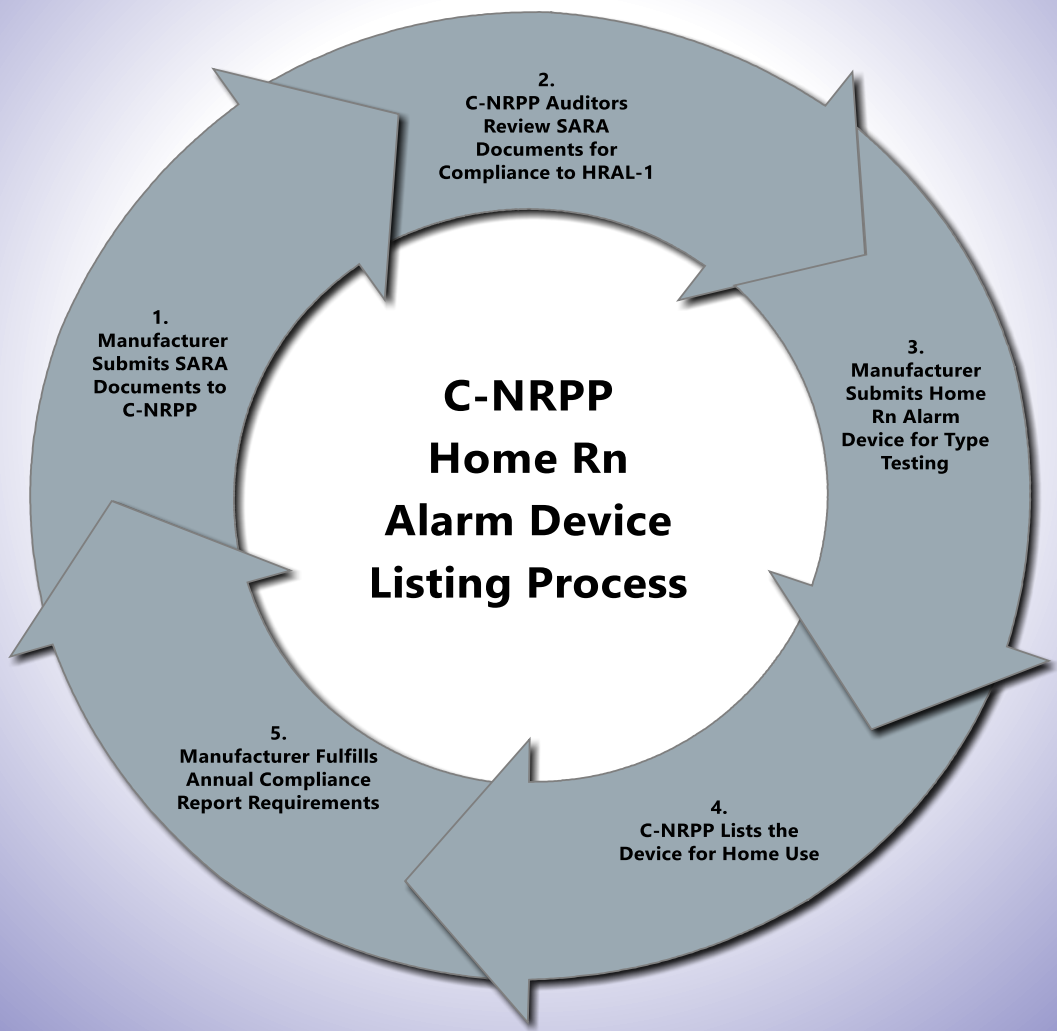
- CAN/CSA-ISO 9001 - 2008, Quality Assurance Model for Quality Assurance in Design, Development, Production, Installation and Servicing.
- CARST Performance Specification Rev. No. 6.24.6, “The Home Radon Alarm Device Listing Requirements Document.”
- CEI IEC 61000-4-2, Electromagnetic Compatibility - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test.
- C-NRPP Procedure No. XXX, Rev. No. 00, “The Implementation & Application Process for Home Radon Alarm Manufacturers – Auditor’s Guide & Checklist.” IEEE STD 315- Graphic Symbols for Electrical and Electronics Diagrams (Including Reference Designation Letters).
- IEC 60617 - Graphical Symbols for Diagrams.



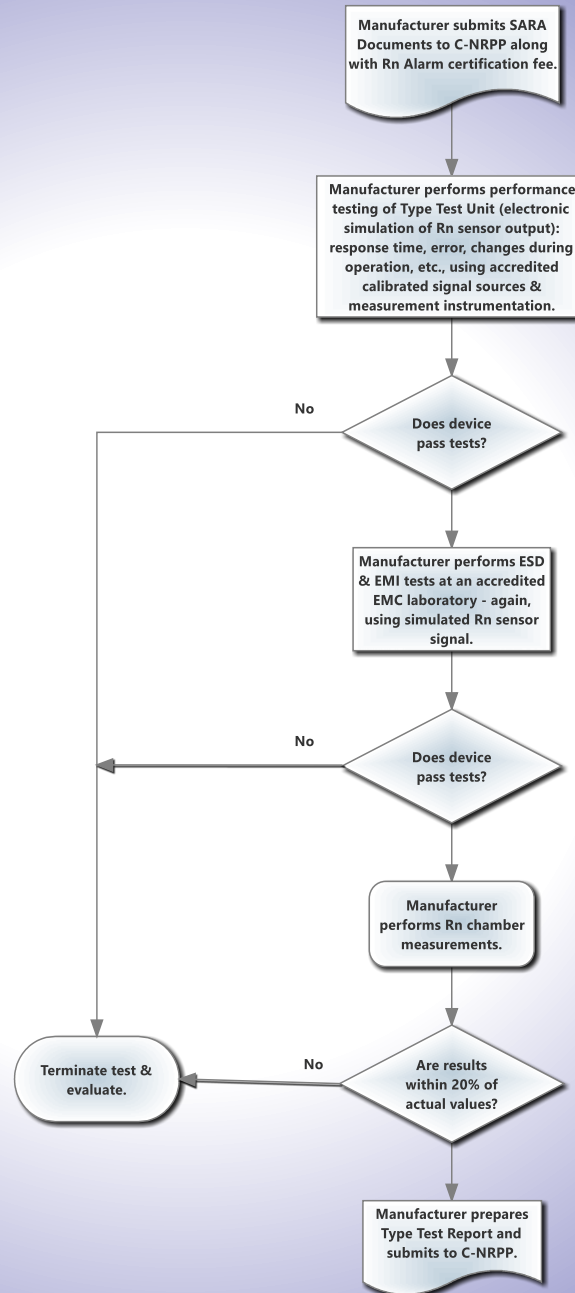
Performance & “Type Test” Requirements

Power Input: Voltage Frequency	115 VAC \pm 15VAC 60 Hz \pm 3Hz
Ambient Temperature Range	10°C – 30°C (21°C typical)
Relative Humidity	Up to 75% (non-condensing)
Pressure	101.325 kPa
Audible Alarm	\geq 80dB (mutable up to 5 days)
Visible Alarm	Must activate when Rn conc. exceeds 200 Bq/m ³ for 30 days etc.
Electro-magnetic Interference <ul style="list-style-type: none"> • Electrostatic discharge (CEI IEC 61000-4-2), operator/user interference, 15kV air or 8kV contact • Cell phone interference, 5 call initiations at 60 second intervals 100 mm from face of TTU, and repeated at a distance of 100 mm from the top horizontal surface of the TTU 	\leq 20% error \leq 20% error
Radon Measurement Accuracy	\pm 20% error





Listing Steps



The Manufacturer's QA Manual

- Management's Quality Policy and Commitment to QA Program,
- clearly defined areas of authority and responsibility pertaining to review & approval re. Document and Design Control * ,
- Quality Objectives,
- **Specifics re. Document & Design Control,**
- Procedures re. Non-Conformance & Corrective Action, Internal Audits.



The Manufacturer's QA Manual

Shall also specify requirements for:

- Manufacturing & QC Procedures (Function & Type Test Procedures, Sampling Plans, Receiving Inspections),
- Commercial Dedication Plan,
- Disposition of Rejects,
- Design Specs., Assembly Dwgs., Schematics,
- Operation/User's Manuals,
- Test Reports, etc.



The Manufacturer's QA Manual

Specifics shall detail the following re.

Document & Design Control:

- Document & Part numbering scheme,
- Document generation & revision process,
- Document Review & Approval process,
- Preparation & control of the DSC or MDL,
- Responsibilities for Document Control,
- Document storage & security.



MASTER DOCUMENT LIST or DOCUMENT STATUS CHART

Issued By: *Product Manager*

MDL or DSC No.:

Date:

Issue No.:

Product: *Radon Home Alarm*

QA Manual

Revision No.:

SARA Documents

Title	Doc. No.	Rev.	QA Approval	Eng. Approval	Agency Approval
<u>Drawings</u>					
General Assembly Schematic					
IMQP Chart					
<u>Bills of Material</u>					
General Assembly Printed Circuit Board Sub-Assembly					
<u>Procedures</u>					
Type Test Procedure					
<u>Reports</u>					
Type Test Report					
<u>Other Documents</u>					
Owner's Operation Manual (with installation instructions)					

Internal Documents

Title	Doc. No.	Rev.	QA Approval	Eng. Approval	Agency Approval
<u>Drawings</u>					
<u>Bills of Material</u>					
<u>Process Sheets</u>					
<u>Manufacturing Procedures</u>					
<u>Quality Control Procedures</u>					



SARA Documents (at time of listing application):

- General Assembly drawing – usually an exploded or isometric view.
- Schematic(s) – graphical presentations of the electronic circuit(s).
- Inspection & Test Plan – a report style document.
- IMQP Chart – a pictorial presentation of all manufacturing and QC steps from RI to final QC function test. Type Test Procedure.

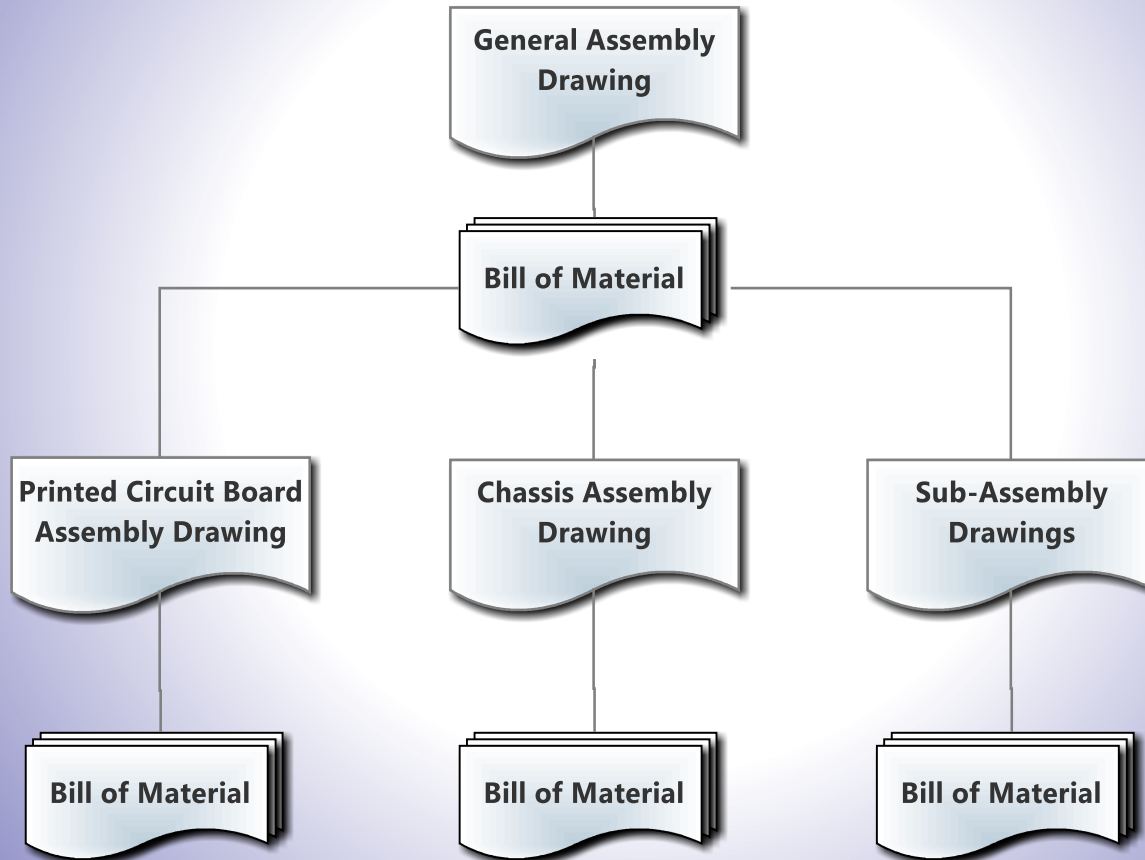


SARA Documents (at time of listing application):

- BOMs – comprehensive lists of all parts/components/materials required to build the device (including part specifications).
- Parts List – similar to a BOM but lacks part specification; not a stand-alone document.
- Type Test Procedure – specific to TTU. Req'd for: ESD, EMI, & Rn Measurement Performance Tests.
- Owner's Operation Manual – provides location/installation, and operation details.



GENERAL ASSEMBLY & BILL OF MATERIAL CHART



STATUS

- Listing Implementation & Review Manual has received initial review.
- Procedure – “Implementation & Application Process for Home Radon Alarm Manufacturers – Auditor’s Guide & Checklist,” is scheduled for completion this summer.
- On-line template for ‘Annual Home Radon Alarm Manufacturer’s Compliance Report,’ to be developed.

