

Rapid RH[®] 4.0 EX Installation Manual



Step 1: Drill the Hole

Correct hole-depth is important in complying with the ASTM F2170 standard. Additionally, for easy installation of a Smart Sensor, a uniformly round hole is also very important. Drill a hole in the concrete slab to the required depth using a rotary-hammer drill and a $\frac{3}{4}$ " (19mm)-diameter masonry drill bit. Per the ASTM F2170 standard, drill the hole to a depth equaling 40% of the slab's thickness for slabs that are drying from one side, or 20% depth for a slab drying from two sides. For proper Rapid RH[®] 4.0 EX installation, be sure to position the drill perpendicular (90°) to the surface being tested.

TIP: If you do not have a depth-gauge for your drill, mark or tape-off your drill bit to the correct depth setting. Vacuum around, and periodically in the hole as you drill to better see your progress and use the depth ruler supplied with your Rapid RH kit to check your depth progress to keep from over-drilling.

IMPORTANT TIP, Hole Uniformity: Even a $\frac{3}{4}$ "-diameter bit meeting ANSI standards may not always drill a uniformly round hole, which may make it difficult to insert a Smart Sensor. **Use the $\frac{3}{4}$ "-diameter section of your black insertion tool a diameter and uniformity gauge to assure you have a correct and uniformly round hole before attempting to insert a Smart Sensor.** If the $\frac{3}{4}$ "-diameter section of the tool will not go easily into the hole, then the drill bit may be out-of-spec (worn out, etc.) or the hole may not have a uniform diameter from top to bottom.

Step 2: Clean the Hole

Attach the vacuum attachment to the straight extension of a shop vacuum cleaner hose* and thoroughly vacuum up the dust in and around the hole. Next, insert the wire bristle brush into the hole. Turn the brush several times to loosen pulverized concrete from the walls of the hole. Vacuum again. Repeat this step twice to ensure no loose concrete particles remain in the hole.

Step 3: Insert the Smart Sensor

Note: The new ASTM F2170 standard (F2170-11) has a revision (from the previous -09 version) calling for the 'sleeve' (liner) to go from the top to the bottom of the hole. The new Rapid RH[®] extension insert approach allows you to easily adhere to this new revision of the ASTM test

method. Additionally, the main, smooth sleeve section of the Smart Sensor barrel is now detachable, allowing for even more convenient use of only the bottom ‘finned’ section of the barrel in shallow-hole applications such as thin topping slabs, etc.

Directly out of the package, the Smart sensor is 1.6” or 40% of a 4” slab. ASTM F2170-11, Section 10.2 states: “*Slab drying from top only (Example: slab on ground with vapor retarder below, or slab on metal deck): 40% depth. Slab drying from top and bottom (Example: elevated structural slab not in metal deck): 20% depth*”. Each Smart Sensor pack includes ten (10) short (0.4”) extensions that can be inserted into the Smart Sensor barrel to enable use in thicker slabs. Adding one insert extends the Smart Sensor barrel length to 2” for testing 5”-thick slabs to the 40% depth. Keep any unused extensions for future jobs. If need be, you can use additional extensions to increase the length of the sensor barrel for thicker slab applications.

In summary, you add one extension insert to a Smart Sensor barrel for every 1” increase in slab thickness over 4” to meet the 40% depth requirement. The extension inserts make the Smart Sensor’s usage flexible for varying thicknesses of concrete.

Now, for all installations, take the Smart Sensor directly out of the package, and with no extensions installed, insert the Smart Sensor into the hole using the insertion tool with orange cap placed atop for ease in pushing down on the insertion tool. Push down on the insertion tool with cap to force the Smart Sensor down inside the hole, “seating” it at the bottom. **(Review the IMPORTANT TIP, hole uniformity comment under Step 1, above)** Under no circumstances should you tap or hammer the insertion tool to attempt to insert the sensor. Doing so may cause damage to the Smart Sensor and will void any warranty. At this point, for 1.6” depth holes (40% of 4”), insert a protective cap into the top of the Smart Sensor base sleeve, and push down to the concrete surface. Or, if testing in thicker slabs, assemble the proper number of extensions, and with the protective cap inserted into the topmost extension, push down the extensions and cap into the hole to the concrete surface, completing the installation.

Remember: Correct depth of hole is critical to adhere to the ASTM F2170 test method.

Caution: NEVER use the Easy Reader to install the Smart Sensor.

Step 4: Take Readings

When ready to take readings, remove the orange protective cap from the Smart Sensor, and ensure no dust or debris are inside. Insert the Rapid RH® Easy Reader firmly until it comes fully into contact with the bottom of the Smart Sensor. Hold the Easy Reader in place until the first relative humidity reading appears on the screen (about three seconds), then immediately remove the Easy Reader. The display will toggle back and forth between the relative humidity value (when the cursor is next to the %RH symbol) and the temperature value (when the cursor is next to the °F or °C symbol*). Once the Easy Reader is removed from the Smart Sensor, the readings from that Smart Sensor will continue to display for approximately 5 minutes or until the Easy Reader is reinserted into another Smart Sensor. After removal, wait at least 5 seconds before inserting the Easy Reader into another Smart Sensor. Replace the Easy Reader’s plastic end caps when not in use.

In most cases, one hour after installation, the Smart Sensor will generally give a reading within 3% RH of the reading you would see after the ASTM-required 72-hour mark. Just remember to follow the ASTM F2170 procedures pertaining to equilibration time. After the initial equilibration has been reached per ASTM F2170 requirements, subsequent readings can be taken instantly. If future testing is needed, replace the protective cap by snapping it back into the Smart Sensor.

Record readings on the enclosed report form in the spaces provided for information required by ASTM F2170, including the date, time, %RH and temperature. The grid at the bottom of the report form can be used to record test-hole locations. Each Smart Sensor is serialized on the outside of the Smart Sensor. Extra copies of the report form and an ASTM F2170 checklist can be downloaded at www.RapidRH.com. You can also visit www.rhspec.com to visit links to various finished flooring manufactures’ installation

guides and their RH thresholds. For any additional questions related to what RH levels are appropriate, please contact the manufacturer of the product to be applied to the concrete slab.

*Rapid RH® Easy Readers that display temperature in Celsius can be identified by their blue labels and blue plastic protective caps.

Step 5: Encapsulate Smart Sensor

If future readings are no longer needed (for example, when ready to apply a floor covering or coating), place the stainless steel metal disk over the Smart Sensor and skim-coat the hole with a cementitious patching compound compatible with the flooring manufacturer's installation instructions.