

**SECTION XXXXXX
UNDERFLOOR ELECTRIC RADIANT HEATING CABLES**

1. GENERAL
	1. SECTION INCLUDES
		1. Underfloor electric floor warming cables.
		2. Thermostats.
		3. Underfloor radiant heating components, accessories and installation material for a complete operating system.
	2. REFERENCES
		1. National Electric Code (NEC).
		2. Canadian Standards Association (CSA).
		3. Underwriters Laboratories (UL).
	3. SUBMITTALS

		1. Submit under provisions of Section XXXXXX.
		2. Manufacturer's data sheets.
		3. Installation Instructions.
	4. PROJECT RECORD DOCUMENTS

A. Accurately record locations of heating cable and thermostat sensor.

* 1. QUALITY ASSURANCE

		1. Manufacturer Qualifications:
			1. Minimum 20 years of experience in design, engineering, manufacture and support of specified system and components.
		2. Product Requirements:
			1. All floor warming equipment furnished under this section shall be supplied by a single manufacturer.
			2. . Installation shall safely control and maintain heat energy compatible with floor material.
				1. Maximum 12 watts per square foot.
			3. UL Listed heating cables or CSA Certified heating cables.
			4. Self-Regulating cable is not acceptable for this application.
	2. DELIVERY, STORAGE, AND HANDLING
		1. Store products in manufacturer's unopened packaging until ready for installation.
	3. PROJECT CONDITIONS
		1. Coordinate installation of heating cable with Electrical Contractor and Flooring Contractor.
		2. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer. Do not install products under environmental conditions outside manufacturer's limits.
1. PRODUCTS
	1. MANUFACTURERS
		1. System shall be supplied by:

Innovair Solutions USA Delta-Therm, 6711 Sands Rd Suite A, Crystal Lake, IL 60014, Phone: 800-526-7887, Fax: 847-526-4456, Email: info@Delta-Therm.com, Web: www.Delta-Therm.com.

* + 1. Substitutions: No substitutions are permitted.
	1. HEATING CABLE
		1. FHM / DWF-R / DTR Cable, PVC Jacketed Heating Resistance Cable:
			1. cULus Listed.
			2. Constant energy output.
			3. Twin heating conductors with fluoropolymer insulation, metal sheath and PVC outer jacket.
			4. Twin conductor heating cable with negligible magnetic field.
			5. Insulation shall be rated for maximum exposure at 221 °F and maximum cable power up to 3 watts/lf (12W/sq.ft.) with a minimum 3’’ spacing, maximum 4 inch spacing (9W/Sq.ft).
			6. Install cable in accordance with detailed layout drawings and installation instructions.
			7. Cable rating shall be:
				1. 120 VAC
				2. 208 VAC
				3. 240 VAC
		2. Floor Heating Thermostat:
			1. Non-programmable, programmable or intelligent thermostat (Wi-Fi) with large back-lit display.
			2. In-floor sensor measures floor temperature.
			3. Built-in Class A GFCI and capacity to switch a 15 amp load without the use of a contactor.
			4. Electronic control can be set to determine when the underfloor heating system should turn on to reach the desired floor temperature by a specified time period.
			5. Thermostat can be set to control Ambient or Floor temperature.
			6. Thermostat rating shall be:
				1. 120VAC
				2. 208VAC
				3. 240VAC
	2. ACCESSORIES
		1. DTR Uncoupling membrane
			1. Fleece back ( for mortar installation ) or Self-adhesive in sheet or roll.
		2. DWF-R Cable strapping:
			1. Floor Warming cable strap that can be fixed with hot glue, staple or screws.

1. EXECUTION
	1. EXAMINATION
		1. Installer to verify field measurements are as shown on Drawings.
		2. Installer to verify that required power is available, in proper location, and ready for use.
		3. Do not begin installation until substrates have been properly prepared.
		4. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
	2. PREPARATION
		1. Clean surfaces prior to installation.
		2. Prepare surfaces as recommended by the manufacturer.
	3. INSTALLATION
		1. Complete installation shall conform to appropriate local codes.
		2. Install cable heaters in accordance as per manufacturer's instructions.
		3. Run temperature sensor towards the center of the room in between two heating cables.
		4. Determine location of thermostat or junction box where cold leads will be run for electrical connection. This location should be on a side where the cable will loop, not on a side parallel to the long run of the heating cable.
		5. Install the heating cable as per manufacturers instructions at the specified spacing.
	4. FIELD QUALITY CONTROL
2. Test continuity of heating cable.
3. Test total resistance (TR) using an ohmmeter. The ohmmeter reading should be within 10% of the calculated Total Resistance.
4. Perform Insulation resistance (IR) or “Megger” test on each heating cable before, during and after installation. Insulation resistance should be greater than 10 megohms.
5. Measure voltage and current at each unit after installation is complete.
6. Submit written test report showing values measured on each test for each cable.
	1. ADJUSTING AND CLEANING
7. Adjust system controls and instruct Owner/Operator.
	1. PROTECTION
8. Protect installed products until completion of project.
9. Repair or replace damaged products before Substantial Completion.

END OF SECTION