

**Part 1 General****1.1 SECTION INCLUDES**

- .1 Electric moisture detection system.
- .2 Monitoring grid.
- .3 Automated Testing and measuring apparatus.

**1.2 RELATED SECTIONS**

- .1 Section 01 23 00 - Alternates.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 07 33 63 - Vegetated Roofing.
- .4 Section [ ] - [ ] Roofing.
- .5 Section 07 55 52 - Modified Bituminous Protected Membrane Roofing.
- .6 Section [ ] - [ ].
- .7 Section 11 24 23 - Window Washing Equipment and Fall Protection.
- .8 Division 22 - Plumbing: Drains and scuppers.
- .9 Division 26 - Electrical: Data connection from system panel to building communications room.

**1.3 REFERENCES**

- .1 RCABC (Roofing Contractors Association of British Columbia) Guarantee Corp. - RCABC Roofing Practices Manual.
- .2 4th International Conference on New Horizons in Green Civil Engineering Paper ID-70 Understanding Low-Slope Extensive Automated Leak Detection Systems

**1.4 SYSTEM DESCRIPTION**

- .1 Installation of permanent moisture monitoring grid, access closure with related data collection electronics facilitates detection of moisture accumulation and membrane leak locations. The moisture accumulations are monitored from the installation of the stainless-steel detection sensors by data-logging electronics and when construction is completed, performed by a remote computer system connected by internet to the SMT building intelligence monitoring center.
- .2 Internet and Power supply by others.

**1.5 ADMINISTRATIVE REQUIREMENTS**

- .1 Section 01 31 00: Project management and coordination procedures.
- .2 Coordination: Coordinate with other work having a direct bearing on work of this section.
- .3 Pre-installation Meeting: Convene in person or by virtual methods four (4) weeks before starting work of membrane roofing.
- .1 Review preparation and installation procedures and coordinating and scheduling required with related work.

**1.6 SUBMITTALS**

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide manufacturer's data sheets for product components and accessories.
- .3 Shop Drawings: Indicate plans, grid layout, dimensions, construction details, methods of anchorage, location and type of roof penetrations and roof drains.
- .1 Indicate location of access closures, wiring path from monitoring grids to access closures.
- .2 Indicate location where grid cables will be terminated and area where monitoring electronics will be installed.
- .3 Indicate location of electrical monitoring around drains and penetrations.

.4 Test Reports: Test reports from an approved testing agency certifying that membrane moisture detection system conforms to performance characteristics and testing requirements specified.

.5 Installation Data: Manufacturer's written installation requirements.

.6 Test Protocol: Manufacturer's written description of testing method and protocol.

### 1.7 CLOSEOUT SUBMITTALS

.1 Section 01 78 00: Submission procedures.

.2 Operation and Maintenance Data: Indicate maintenance requirements for installed products.

.3 Maintenance Service: Submit proposal for separate fee agreement between the Owner and the detection and monitoring system. Include Monthly standard reports with overlays on record drawings. Reports shall include name, address, date and time created, dates of initial wetting and subsequent dates of drying including trend analysis in graph format. Email to Owner-designated recipients

### 1.8 QUALITY ASSURANCE

.1 Products to be listed as Accepted Materials in the RCABC Roofing Practices Manual.

.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this Section with minimum three (3) years documented experience.

.3 Installer Qualifications: Company specializing in performing the work of this Section with minimum three (3) years documented experience and approved by the manufacturer.

.4 Testing Agency Qualifications: Company specializing in performing the work of this Section with minimum three (3) years documented experience and approved by the manufacturer.

### 1.9 DELIVERY, STORAGE AND HANDLING

.1 Section 01 60 00: Transport, handle, store, and protect products.

.2 Protect electronic equipment and sensing and detection devices against potential damage from dust and moisture.

### 1.10 ENVIRONMENTAL REQUIREMENTS

.1 Do not install the leak detection sensor elements to damp or frozen surfaces or during inclement weather.

### 1.11 WARRANTY

.1 Manufacturer's Warranty: Provide a two (2) year manufacturer's warranty

## Part 2 Products

### 2.1 MANUFACTURERS

.1 SMT Research Ltd.: 778-373-2070 or 778-373-2071. [www.smtresearch.ca](http://www.smtresearch.ca)

### 2.2 COMPONENTS

.1 Moisture Detection Sensors: Type 316 stainless steel conductor tape; laminated tape construction with two cables and self-adhering insulating substrate.

.2 Access Closure: Size appropriately with space for cable terminations on terminal blocks and monitoring electronics and screw terminal barrier blocks for connecting grid cable and to provide field test access.

.1 Interior mounting locations: Metal box enclosure. Provide approximately 400 x 350 x 150 mm deep (16 x 14 x 6 inches) box per 500 sq.m (5,400 sq.ft) of roof deck monitored.

.2 Exterior mounting locations: Watertight fiberglass enclosure which is approved for outdoor use. Provide approximately 400 x 350 x 150 mm deep (16 x 14 x 6 inches) box per 500 sq.m (5,400 sq.ft) of roof deck monitored.

.3 Monitoring Electronics: A3 or WiDAQ, or MultiSCAN board: Automated switching and data logging measurement unit that facilitates the monitoring grid installed on the dryside of waterproof membranes.

.4 Building/Tactical Intelligence Gateway (BiG/TiG) Automated monitoring system for permanent installation to the master access closure for real-time monitoring of the membrane grid system. Provide required A3 or MultiSCAN boards, on-site gateway and connection to the internet.

.5 Others are to provide 110v power and Internet connection at locations of main access enclosures.

.6 On-line Monitoring Centre: Provide on-line monitoring of data, including water intrusion, moisture accumulation conditions of each monitored area. Reports shall include text descriptions and two-dimensional graphs relating zone-specific moisture accumulations and dissipations over specified time ranges. Event Report including system identification, location of flood event. Send to Owner-designated targets via email.

.7 Electrical Cable and Accessories: As recommended by the system manufacturer.

### **2.3 COMPONENTS (ALTERNATE PRICE)**

.1 Provide on-site gateway and connection to internet system. Others to provide 110v power and internet connection at location of main access enclosure. Others to provide programming of building BMS system.

.2 BIM model overlay and roof moisture status interface with virtual and Augmented Reality interface. Design team or general contractor shall provide BIM model for use in application related to the display of data on 3D model with live and historic data from SMT Online monitoring center

## **Part 3 Execution**

### **3.1 EXAMINATION**

.1 Section 01 71 00: Verify existing conditions before starting work.

.2 Verify that the vapour barrier is sufficiently dry and clean prior to installation of the two conductor stainless steel moisture detection sensor tape.

.3 Verify that each Moisture Detection tape is electrically isolated from conduit, or building materials by applying applications of additional layers of non-conductive waterproof material or other electrically insulating materials.

.4 Coordinate with the responsible entity to correct unsatisfactory conditions.

.5 Commencement of work by surveyor is acceptance of installation conditions.

### **3.2 PREPARATION**

.1 Surfaces which Membranes to be scanned to be broom clean, construction materials, equipment and debris.

### **3.3 INSTALLATION - MONITORING GRID**

.1 Install monitoring grid to manufacturer's written instructions and approved shop drawings.

.2 Place a sensor conductor with Type 316 stainless steel conductors in the specified pattern below the waterproof membrane, as per manufacturer's instructions.

.3 Space Moisture Detection Tape (MDT) sensors in a grid fashion with spacing typically **3m**, installed on the AVB, for dry side monitoring of moisture conditions in the conventional built up roof system. .

.4 Provide specific detection tape zones around drains and penetrations

.5 Provide maximum length of detection tape zone to be: **6m (20ft.)** or as shown on drawings.

### **3.4 INSTALLATION - ACCESS CLOSURE**

.1 Install access closure to manufacturer's written instructions.

.2 Install and terminate electrical cables from the grid on approved screw terminal blocks or IDC connection blocks in access closure.

**3.5 INSTALLATION PROCEDURE**

- .1 Perform initial scan to establish baseline conditions to equipment manufacturer's written requirements.
- .2 Verify wiring sequence, electrical continuity and the absence of shorts or grounds.
- .3 Perform test of moisture monitoring system prior to installation of insulation, protection boards, and membrane.
- .4 Commence monitoring of the Stainless-Steel Moisture detection tapes as soon as physically possible after installation on automated data-logging electronics.
- .5 Record location and photo of moisture detection tape location under the membrane on sketch or drawings for communication with contractor and/or inspector.
- .6 Perform final waterproof survey immediately prior to the installation of over burden or vegetated roof [optional]

**3.6 FIELD QUALITY CONTROL**

- .1 Section 01 45 00: Field inspection and testing.
- .2 Require site attendance of roofing manufacturer representative during installation of the Work.
- .3 Correct identified defects or irregularities.

Field Reports: Identify date, time, and weather conditions when surveys are conducted.

- .1 Provide general description of scan/survey equipment and process.
- .2 Describe typical membrane breaches located and areas not accessible by scanning equipment.
- .3 Document survey with photographs and plan view scale drawings with approximate location of breaches noted.

System Reports: Identify date, time, and weather conditions when system measurements<sup>6</sup> are conducted for passive or automated reports.

- .1 Provide general description of active electronics and equipment and process.
- .2 Provide data visualization on plan view scale drawings with approximate location of , sensor elements and conditions report of the membrane, with moisture level noted.

**END OF SECTION 07 01 73**