

**ARCHITECTURAL GUIDE SPECIFICATION**  
**Moisture Intrusion Detection**  
**for**  
**Built-up, Modified Bitumen, or Composite BUR/MOD BIT Adhered Roofing Systems**  
**Insulation: Fully Adhered**

**1.00 Moisture Intrusion Detection System**

A moisture intrusion detection system shall be permanently installed in the roofing system to provide early detection and warning for roof membrane subsurface moisture intrusion. The Moisture Intrusion Detection System is comprised of the Receiver Control Center(s), Sensor Units and selected optional Accessories.

**1.01 Sensors**

The moisture intrusion detection system shall incorporate sensors placed upon approximate sixteen (16) feet centers in the base insulation layer. The sensors shall be of either single, three, or of five sensor configurations. Each sensor is to include its own power source requiring no external power. Each sensor is to have a unique identification number which is transmitted via radio frequency to a receiver control center. **NO WIRES MAY PENETRATE THE BUILT-UP MEMBRANE OF THE ROOF.** The sensors must be capable of detecting a minimum of at least two (2) ounces of water upon contact. The sensors must be capable of broadcasting the unique sensor identification number to the receiver control center once water has been detected. The sensors must be capable of transmitting over a minimum of three (3) frequencies to insure the integrity of the signal reaching the antenna of the Receiver Control Center in case one or more frequencies are blocked by external sources. The sensors must be capable of transmitting five hundred (500) feet line of sight distances with no obstructions. The sensors shall be capable of withstanding temperatures between -40 F and 194 F without degradation of response. The sensor shall be capable of supporting a three hundred and fifty (350) pound load.

**1.02 Receiver Control Center(s)**

The moisture intrusion detection system shall include a Receiver Control Center which shall be capable of receiving and displaying the signals of the sensors specified in section 1.01. The Receiver Control Center shall receive the signal through an antenna which may be mounted directly on the receiver or mounted remotely on the roof and connected by the required cable. The antenna shall be located where reception of the signal from all sensor locations is assured. The Receiver Control Center shall sample the signal from the sensor for a minimum of three successful samples before alarming to minimize the possibility of false alarm. The Receiver Control Center will display the alarm visually with a flashing red light internal to the receiver and an audible alarm through a built-in horn. The Receiver Control Center shall be capable of interfacing to other external devices through a contact closure output. The Receiver Control center shall display the sensor number, date in terms of month, day, year and time of the alarm. Each alarm must be stored in permanent non-volatile memory not requiring battery back-up for a minimum of up to 256 alarms. The Receiver Control Center shall be 115/120 volt, 60Hz powered with integral capability of twelve (12) hours of continued operation provided by battery back-up in the event of power failure.

**1.03 Optional Accessories**

- 1.03.1 Telephone interface with power supply.
- 1.03.2 External mounted alarm light with power supply.
- 1.03.3 External mounted alarm horn with power supply.
- 1.03.4 Roof mounted antenna and cable.

**1.04 Equipment Supply**

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1.04.1

The sensors shall be manufactured by MID Systems, Inc. and furnished by an authorized, trained distributor of the equipment manufacturer. The sensors shall be shipped directly to the owner, general contractor or roofing contractor and shall be installed by the roofing contractor.

1.04.2

The Receiver Control Center shall be manufactured by MID Systems, Inc. and furnished by an authorized, trained distributor of the equipment manufacturer. The Receiver Control Center shall be shipped directly to the owner, general contractor or roofing contractor and shall be installed by the manufacturer's authorized, trained distributor.

**1.05 Installation of the Moisture Intrusion Detection System**

1.05.1

The sensors shall be installed by the successful roofing contractor. The sensors will be delivered to the job site per the schedule provided by the successful roofing contractor. The successful roofing contractor will provide a schedule a minimum of four weeks in advance of the first sensor installation date.

1.05.2

The Receiver Control Center, antenna, coaxial cable, cable connections and other approved accessories shall be installed by a trained, authorized distributor of the equipment manufacturer. The authorized distributor will be responsible for testing proper UHF signal reception and establishing the proper location of the antenna.

1.05.3

The roofing contractor shall install a 1 inch approved pipe penetration through the roof deck for the installation of the coax cable and the mounting support for the antenna. The location of the pipe penetration shall be in a area free from obstructions to prevent radio signal interferences.

1.05.4

Where required by the building codes, a raceway for the installation of the coax cable shall be provided by others between the permanent location of the Receiver Control Center and the antenna.

1.05.5

A 115/120 volt alternating current circuit shall be provided by others at the temporary and permanent mounting locations of the Receiver Control Center.

1.05.6

The Receiver Control Center shall be installed in a dry location where the temperature is between 32 degrees F and 120 degrees F and the relative humidity is between 5% and 95%.

**1.06 Training**

1.06.1

The successful roofing contractor shall receive training by the manufacturer's authorized distributor of the moisture intrusion detection system prior to the installation of the sensors. The successful roofing contractor will install the sensors strictly in accordance with the manufacturer's written instructions and training guidelines. Any deviations from these procedures must be approved in advance in writing from the manufacturer's authorized distributor or by the manufacturer.

1.06.2

The manufacturer's authorized distributor or the manufacturer of the moisture intrusion detection system

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shall provide the owner of the system with on site training on the use and maintenance of the system.

**1.07 Documentation and Submittals**

1.07.1

The successful roofing contractor shall supply the manufacturer's authorized distributor with a roof plan showing dimensions and accurate locations of all roof penetrations and the approved tapered insulation layout if applicable.

1.07.2

The authorized distributor of the manufacturer of the moisture intrusion detection system shall submit to the architect a detailed layout of the proposed sensor locations in the roofing system. The approved layout shall be given to the roofing contractor for the installation of the sensors.

1.07.3

The roofing contractor shall submit to the manufacturer's authorized distributor and the architect as-built drawings of the installation of the sensors in the roofing system showing sensor number and exact location of each sensor.

1.07.4

The authorized distributor of the manufacturer of the moisture intrusion system shall submit as-built drawings for the installation of the Receiver Control Center and the location of the antenna and coaxial cables.

**1.08 Delivery, Storage and Handling**

1.08.1

The contractor shall store the sensor units in a covered dry place where they will remain dry and will not be exposed to excessive moisture, relative humidity exceeding eighty (80) percent, and/or water. The sensor units shall remain in the original packaging until time of installation.

1.08.2

The sensor units and cable shall be handled as sensitive electronic equipment so as to prevent damage to the electronics, housing, battery and cable.

1.08.3

The sensor units shall be protected from hot bituminous materials used for adhering insulation boards so as to prevent damage.

1.08.4

Only hand pressure will be used when inserting the sensor units in the prepared hole cut in the insulation.

1.08.5

Sensor units damaged in handling, storage or shipping shall be removed from the job site.

**2.01 Manufacturer**

2.01.1

The moisture intrusion detection system shall be as manufactured by MID Systems, Inc., 222 Beltway Blvd. Matthews, NC 28104, Ph (704) 882-0659 Fax (704) 882-7530 .

**3.01 General Roofing System Requirements**

3.01.1

This Section provides the minimum requirements of the roofing system components and installation to

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maximize the performance of the moisture intrusion detection system.

**3.02 Roof Construction:**

**Membrane Hot or Cold applied BUR or Modified Bitumen or Composite Insulation: Fully adhered with hot or cold bitumen or adhesives.**

3.02.1

Remove and dispose of the existing roofing system as required for the specified project.

3.02.2

Two (2) layers of insulation must be installed with staggered joints, the bottom layer must be 1 inch thick minimum and the top layer must be ½ inch thick minimum.

3.02.3

Install a one (1) ply Type IV or Type VI fiberglass felt in bituminous mopping over the entire surface of the base layer or first layer of insulation. When using more than two (2) layers of insulation, install the MID sensors directly beneath the "T" butt joints of the top layer of insulation or recovery board, and install a one (1) ply Type IV or Type VI fiberglass felt in bituminous mopping over the entire surface beneath the final layer of insulation.

3.02.4

Set the sensor units directly beneath the "T" butt joints of the overlayment insulation and caulk around core joint and in each direction of the "T" butt joint approximately 2 feet. Caulking to be approved by the roofing material manufacturer.

3.02.5

Install built-up membrane as specified for the project.

**3.03 Roofing Membrane**

3.05.1

Built-up, Modified Bitumen, or Composite BUR/MOD BIT roofing membrane.

**4.01 Inspection**

4.01.1

The roofing contractor shall examine the surface and verify that there are no conditions such as moisture in the insulation which would prevent the satisfactory installation of the moisture intrusion detection system.

4.01.2

The roofing contractor must verify that the general roofing system requirements as established in section 3.01 are met.

4.01.3

Any conditions requiring correction or completion shall be corrected or completed prior to the installation of the moisture intrusion detection system. The roofing contractor shall notify the architect, engineer, consultant or owner in writing of unacceptable conditions.

4.01.4

The roofing contractor shall perform daily inspections of the Receiver Control Center, antenna and cable to ensure no loss of power to the Receiver Control Center and the antenna and cable are properly connected. Also, daily inspections shall be performed to document any roof sensor alarms during the construction of

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the  
roofing system.

**4.02 Preparation**

4.02.1

Roofing systems on which the moisture intrusion detection system shall be installed shall be designed as stated in Section 3.01 above.

**4.03 Installation**

4.03.1

Follow the customized installation procedures that are provided by the manufacturer of the moisture intrusion system or the manufacturer's authorized distributor.

4.03.2

Install roofing insulation as specified. Install a one (1) ply Type IV or Type VI fiberglass felt in bituminous mopping over the entire surface of the base layer or first layer of insulation. When using more than two (2) layers of insulation, install the MID sensors directly beneath the "T" butt joints of the top layer of insulation or recover board, and install a one (1) ply Type IV or Type VI fiberglass felt in bituminous mopping over the entire surface beneath the final layer of insulation. Install final layer of insulation. Upon completion of the installation of insulation layers and one (1) ply of Type IV or Type VI fiberglass felt, layout and mark the location of the sensor units as required from the installation drawing approved by the architect.

4.03.3

Using coring tools supplied by the manufacturer of the moisture intrusion detection system or the manufacturer's authorized distributor, cut a hole through the upper layer of insulation and into the in the base layer of insulation and remove the plug. Where the base layer of insulation is greater than 1 inch thick, cut the required amount from the core to ensure that the sensor is flush or slightly recessed in the hole when installed and reinstall in hole. Cut plugs out of thickness of insulation used for final layer. The hole shall be smooth and of proper size to receive the sensor unit so that the side walls of the sensor unit fits snugly against the walls of the hole.

4.03.4

Place the sensor unit into the hole by firmly pressing the sensor unit into the hole to ensure full contact at entire perimeter of the insulation and with the top of the sensor unit flush or slightly recessed with the top surface of the bottom layer of insulation. Install overlayment plug and caulk perimeter of plug above sensor and in 2 feet in each direction of "T" butt joint, using caulking approved by roofing material manufacturer or supplier. Install the membrane roofing as specified.

4.03.5

Mark the sensor unit number and exact location with dimensions on the approved roof sensor layout drawing..

4.03.6

In some cases, the sensor units must be installed after completion of the insulation system and prior to the installation of the roofing membrane, cut a plug out of the same insulation material and place on top of the Sensor unit.

4.03.7

Layout the cable connecting the main sensor unit to the satellite units with the cable parallel to the boards

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- 4.03.8 joints. Singular sensor units are independent without a cable.
- 4.03.8 Place a 12" x 12" impervious material above the "T" butt joint of overlayment insulation above each sensor location prior to installing the built-up membrane.

**End of Section**

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