

INFRARED ROOF MOISTURE SURVEY

PART 1 - GENERAL

1.1 SUMMARY

- A. Engage an Independent Testing Agency to provide a Certified Thermographer to perform an Infrared Roof Moisture Survey to determine and document the locations and extent of sub-surface moisture within the roof.

1.2 SUBMITTALS

- A. Comprehensive Report: Prepare and submit a final report documenting the survey techniques and findings. The report will be provided in hard copy and digital format (email) and will include the following information:

- Weather Conditions
- Thermographic Testing Principles
- Roof Construction Details (If Available)
- Survey Procedures
- Thermographic and Control Imagery
- AutoCAD® Drawings Documenting All Test Results
- Summary of Findings:
 - Total Square Footage of Roof(s) inspected
 - Number of Wet Areas Detected
 - Total Square Footage of Wet Areas
 - Percentage of Wet Area

1.3 QUALITY ASSURANCE

- A. Installing and Testing Firm Qualifications: The approved Independent Testing Agency shall have a minimum three year record of satisfactory experience providing Infrared Roof Moisture Surveys on projects of similar construction, size and scope.

PART 2 - PRODUCTS

2.1 INFRARED ROOF MOISTURE SURVEY

- A. Independent Testing Agency, Basis of Design: **IR Analyzers, Inc.** (800-879-1964) Infrared Roof Moisture Survey - Nondestructive Testing.

2.2 INFRARED ROOF MOISTURE SURVEY

- A. Scope: Perform an Infrared Roof Moisture Survey of all roof surfaces in the contract. Testing shall be performed on a dry membrane surface. Any areas with surface moisture or obstructions (dampness, ponding, icing, debris, equipment, etc.) shall be documented and classified as NOT INSPECTED.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Visual Inspection: The Certified Thermographer shall meet with a person familiar with the roof's history and visually inspect the roof before the survey.

3.2 TESTING PROCEDURES - INFRARED ROOF MOISTURE SURVEY

- A. Testing equipment: Minimum test equipment shall consist of a high resolution infrared thermal imager operating in the *long wave end of the infrared spectrum (c.9-14 microns)*. Please note: to provide accurate test results when inspecting membrane surfaces that have significant reflectivity (e.g. newer thermoplastic membranes -TPOs, PVCs, etc. and roofs with newer reflective coatings), a high resolution infrared thermal imager operating in the *short wave end of the infrared spectrum (c.2-5 microns)* must be substituted.
- B. Thermographic Testing: Perform an infrared thermographic survey of all roofs in the contract to detect areas of sub-surface moisture. Please note: The infrared survey must be performed at night in order to obtain high-quality information. The testing personnel will typically arrive just before sunset to set up equipment, perform a visual inspection before the survey to confirm the areas to be tested, and identify any safety hazards. Safe OSHA approved unrestricted access to all roof areas must be provided throughout the testing.
- C. Ambient Test Conditions: The infrared survey shall be performed in the evening following a day when there is sufficient sunshine to create

accurate thermal anomalies of sub-surface moisture. Wind speeds during the testing shall not exceed 15 MPH.

- D. Scanning Window Operation: The infrared survey shall be performed only during the period when the “scanning window” is open (time period during which the infrared survey can be successfully conducted) and the roof is presenting reliable thermal images of sub-surface moisture. To ensure that the entire survey was conducted under reliable conditions, at the end of the testing the first portion of the survey shall be repeated to verify that the thermal images generated at the beginning of the survey still accurately indicate moisture damage.
- E. Roof Mark Out: Outline the affected areas on the roof membrane with long-lasting spray paint, lumber crayon, tape, etc. – customer choice.
- F. Thermographic Imagery: Provide thermograms (digital infrared images) and reference photos (digital visible light images taken during the survey) of sample areas of sub-surface moisture detected.
- G. Construction Details: Whenever permitted, extract a core sample from the existing roof, and document roof components and effective R-Values. All sites of invasive testing will be repaired in a manner that will not impair the membrane’s waterproof integrity.

3.3 FIELD QUALITY CONTROL

- A. Invasive Verification Procedures: Whenever permitted, utilize core samples and / or moisture probes to verify the presence or absence of moisture damage. All sites of invasive testing will be repaired in a manner that will not impair the membrane’s waterproof integrity.
- B. If invasive testing is not permitted, any indications of sub-surface moisture will be reported as Suspected or Probable areas of moisture damage.
- C. Noninvasive Verification Procedures: Moisture testing equipment such as Nuclear Radioisotopic and/or Capacitance / Impedance meters shall be used in support of the infrared survey in areas that may not be exhibiting reliable thermal anomalies. These include, but are not limited to, roof areas that were significantly shaded during the day, or are too reflective to generate accurate thermal patterns.

