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INFRARED THERMOGRAPHY METHOD STATEMENT FOR LOCATING POSSIBLE DEFECT ON THE ROOF SURFACE

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1 INTRODUCTION

The infrared thermography techniques can be used for locating a number of subsurface features. These include differences in radiated thermal energy from electrical installation delaminations or debonding and location of entrapped moisture in structures.

2 THEORY

Infrared thermography utilises an infrared sensor in the form of a camera.

All Objects above absolute zero temperature emit infrared radiation. This radiation is picked up by the sensor and after processing an image is displayed on the viewfinder of the infrared camera.

The camera changes radiated thermal energy from an object into electrical signals. These signals are then amplified and sent to the processing part of the camera, the signals are then re-amplified producing and image which is displayed on the viewfinder.

When scanning an interface such as a leaking electrical circuit or leaking waterproof membrane differences in thermal energy will be found. These differences will be transmitted to the camera and displayed on the viewfinder.

The greater the difference in radiated thermal energy between the interfaces the greater the difference in electrical signal or voltage. The viewfinder is set to focus any differences in voltage; the greater the voltage produced (the greater the contrast between materials) the brighter the object appears on the viewfinder.

The radiated thermal energy can be determined by making measurements on site of a known object. The thermal energy of this object can then be used to evaluate the thermal energy of any feature.

It should be noted that thermographic investigations of exterior surfaces generally have to be carried out during the cooling phase, i.e. in the evening, early morning or when the sun has just moved away from the surface being investigated. The reason for this is that thermal images can be significantly distorted by reflected radiation from the sun and by convection currents.

3 EQUIPMENT SET-UP

3.1 Infrared thermography Camera
3.2 Thermometer
3.3 Humidity Meter
3.4 Photo Camera

4 ON-SITE CALIBRATION

Calibrate the camera in-site by comparison of a known hot and cold object (e.g., handprint (hot) on a wall (cold) and observe the optimum brightness and contrast settings. These settings must not be changed during the whole scanning process.

5 TEST METHOD

5.1 Observe the following conditions before testing :

5.1.1 The temperature difference that is required for the test on exterior testing is mainly dependent upon weather conditions. When the weather is overcast or raining, it is not possible to carry out infrared thermography scanning due to the resulting lack of temperature change.

5.1.2 Infrared thermographic scanning for interior work may require induced heating.

5.1.3 Solar reflections and any other conditions that may affect the validity of the test (i.e., air conditioning system, heaters, cold and heated object, etc.) must be noted in a sketch map of the test area and stated "Not Tested"

5.2 Prepare a grid system and the test area as indicated below :

5.2.1 Make a layout on paper (gridlines of vertical and horizontal lines) of the test area using various objects as reference points on the building (e.g, edge of building, window edges, air conditioner, electrical circuit braker box etc.) at regular intervals take a photograph of the area if applicable or as appropriate on scaled down proportions.

6 PROCEDURE OF SURVEY

6.1 The general contractors shall provided attendance including sealing of all outlets and if necessary constructing dams to compartmentalize large roofs. The roof shall than be flooded for 24 hours. After flooding, all outlet blockages and dam shall be removed to drain the roof.

6.2 The infrared thermography survey shall be conducted by the laboratory within a 48 hours period after release of water to establish of there was penetration through the roofing installation.