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Diocese of Cleveland Facilities Services Corporation

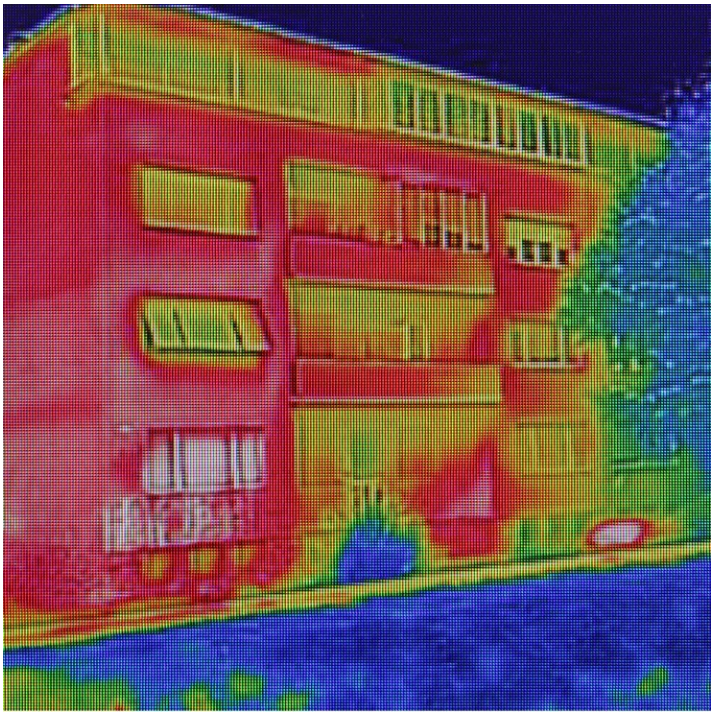
Planning an Infrared Building Exterior Survey

There is a saying, "A picture is worth a thousand words." This is so true when it comes to investing in a **building exterior infrared survey**. On a cold dark evening in the winter one can stand outside their building or their home and will see an obscure shadow of the facility in the night with the only lights coming from the facility's windows. Beyond that, one doesn't see what the building heating system is doing: producing heat to compensate for heat loss being drawn to the cold outdoors. One definition of "heat loss" is a measure of the total transfer of heat through the fabric of a building from inside to the outside, either from conduction, convection, radiation, or any combination of the these. While this transferring is occurring, no one can see it, so a building manager or homeowner doesn't recognize the seriousness of this occurring while they stand outside.

For the energy conscious individual anxious to reduce consumption and its utility cost associated with what may be excessive heat loss there is a solution that, many times will prove to be cost effective and have a return-on-investment. An infrared survey completed, and the report recommendations implemented can be money well spent. In fact, a homeowner or facility manager can do their own infrared survey by purchasing the required equipment, but it is probably better to leave this assignment to someone trained in infrared surveys because there are tricks-to-the-trade when undertaking such a project.

It is safe to say, "You can't fix what you don't see." An infrared building exterior survey can create the energy loss picture needed to take the next step to reducing monthly utility costs both for the heating season and the air-conditioning season.

So how does an infrared survey work? Well a comprehensive building survey, not a residential survey requires a detailed "scope of work" request for proposal. The following is based on *Infraspection*



Institute https://infraspection.com which is a training and certification firm for thermographers (infrared scanners) and the abbreviated Scope of Work we have taken from this web site:

- Building Owner's program goals
- Applicable State and Federal regulations and codes.
- Infrared operating procedures and operator/ thermographer qualifications.
- List of responsibilities between the Building Owner and the infrared thermographer including building accessibility, safety, etc.
- Procedures for conducting infrared inspections of building envelopes for the purpose of detecting thermal patterns caused by excess energy loss, latent moisture, or structural details.
- Standard document for infrared inspections and for the infrared thermographer to complete.
- Standard Final Infrared Survey Report format.

The purpose of an infrared inspection of a building envelope is to locate and document abnormal patterns of infrared radiation from the building envelope while identifying exceptions that maybe potential problems for the building owner e.g., water-saturated insulation.

Prior to the survey, the building owner will inform the thermographer of any past and current problems with the facility to be inspected and the reasons for conducting the inspection. Also, the building will be heated or cooled to a uniform air temperature throughout the facility. The building owner assigns an operation technician to manage and control the building's heating, ventilating, and air-conditioning (HVAC) system(s) so that the thermographer can complete air leakage inspections as well as document excessive heat loss spots. The building owner also provides a qualified assistant familiar with the construction and history of the facility responsible for gaining access to and maintaining the security of the facility. In addition, the thermographer should have access to the building record drawings for review prior to the start of the survey, as well as to reference during and after the work is completed.

The thermographer's final report should include the following:

- Executive Summary to process overview, findings, and recommendations. Budgeting the corrective measures may not be part of the survey final report requiring a contractor to provide the corrective measure cost estimate(s) and timeline. The return-on-investment calculations may also not be part of this infrared survey report requiring an energy engineer to use the contractor's budget corrective measure costs to complete the return-on-investment.
- Name of the assistant(s) accompanying the infrared thermographer during the inspection and date(s) of the survey.
- Weather conditions, time-of-day, inside and outside air temperatures, wind speed and direction, and the sky conditions at the time of the survey.
- Manufacturer, model and serial number of the infrared equipment used and the date of the equipment calibration.
- Description of the location and construction of the building(s) that were inspected along with photographs of the infrared photograph scans including reference to parts of the building under negative, positive, and/or neutral pressures at the time of the survey.
- Exterior scans of each side of the building, roof(s), underside of overhang, basement foundations, etc. showing infrared results e.g., excessive heat loss through window versus insulated exterior wall around the window, exhaust air vents, etc.
- Hard copies of the report with additional photographs, sketches and/or drawings as deemed necessary to complete the report.

While this report and its documentation can be technically involved, for the layperson reviewing the report, the visual images photographed in this report provides that "A picture is worth a thousand words" results the building owner is looking for. At the same time, the building owner can begin to make decisions as to what the next step(s) will be. Based on the amount of severity of the heat loss, a contractor may complete a budget estimate to make energy conservation improvements. Also, based on the infrared survey report the building owner may want to hire an Energy Consulting Engineer to complete heat loss calculations to support the initiative to correct many, if not all the heat loss deficiencies. Keeping records of the past 2-3 years of utility bills and completing this improvement initiative the building owner will be able to benchmark before versus after the infrared building exterior survey action plan.

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