LE THERMOGRAPHE
SERVICE D'ANALYSE THERMIQUE

Inspection Report

Building Thermography

Client :

Rapid Bloc: Block on block compare to Modular

Date : 2025-03-03

No.

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Instruments :

Caméra Infrarouge :

FLIR T-560 2023 (Professionnal grade)
IR Resolution of 640 x 480 (307 200 Active Pixels)
Spectral range : 7.5 - 14.0 µm
Longueur focale : 17mm (0,67in)
Ouverture f : 1.3
Spatiale Resolution (CdV instan) : 0.7 mrad/pixel
Precision : ±2°C (±3.6°F) ou ±2% de la lecture
Reach : -20°C à 120°C et 0°C à 650°C
Sensitivity /NETD: <40 mK, 24° à +30°C (+86°F)
UltraMax feature for better resolution

Moisture meter :

FLIR MR59 (Professionnel)
Measurement Depth: Up to 100 mm (4") depending on the material
Relative Humidity Range: 0 to 100%
Compliant with CE, RCM, FCC/IC certifications

Anemometer :

Extech 45168CP
Wind Speed Measurement: 0.8 to 72.0 km/h
Atmospheric Temperature Measurement: 5 to 122°F (-15 to 50°C)
Relative Humidity Range: 0.1 to 99.9% RH
Dew Point Measurement: -4 to 122°F (-20 to 50°C)
Wet Bulb Range: 23 to 122°F (-5 to 50°C)

Limitations :

The results and interpretations of this report are based on conditions present during on-site verifications. The information and data provided in the report, with regard to the areas observed, may disregard any element not mentioned in the report and which falls outside the current mandate. The information and recommendations presented in the report are based on the data available during the visit and according to the areas of expertise specific to the thermographer performing the inspection.

To perform an accurate and optimal building thermography, good weather conditions are essential;
- A differential of 10˚C between the indoor and outdoor temperature (except for the detection of humidity in materials (5˚C))
- No rain or fog *
- Winds with a velocity of less than 20 km / h *
- No solar rays in direct contact with the building envelope *
*: for building envelope inspections only

Each equipment has its own limitations. For example, a professional level infrared camera is accurate to ± 2˚C or ± 2% and has a sensitivity of 40mK. It is the same for a moisture meter, an ammeter clamp or an anemometer.

Expertise limitation:
Our technicians each have their own fields of expertise. However, they will not have the answer to all the anomalies they encounter. It is therefore possible that experts or other advisers will be referred to you to find the source of an anomaly or to resolve it. To meet your needs, we can therefore contact: electricians, building inspectors, window workers, a general contractor, etc. They will be able, when necessary, to help us find the source of a problem or to help you rectify it.

The infrared camera can detect:
- Insulation failures
- Air infiltration and exfiltration
- Materials impregnated with moisture
- Gas loss in high efficiency windows
- The presence of insects (nests) and vermin
- Electrical dangers
- The poor quality of construction

Description of mandate :

We were hired by Rapid Bloc to compare the performance of different construction products/methods. We inspected several buildings of different types and addresses using thermal imaging to obtain sufficient data for a proper comparison with existing buildings on the market.

The inspections took place on the same day under similar conditions. The indoor and outdoor temperatures were measured at the beginning of each inspection at each address. We inspected two building types at two different addresses. The following are the building/construction types we compared: a building constructed with modular insulation panels, and a Rapid Bloc building - block-on-block (one to two blocks as foundations instead of a conventional foundation or slab).

In this report, we will describe our observations for each product, as well as their strengths and weaknesses based on our thermal analysis.

Here are the exterior temperatures measured during the inspection of the various products:

Modular Insulation Panels: -16 degrees C
Blocks on blocks: -15 degrees C

Please note: Exterior and interior temperatures as well as humidity levels were measured before each inspection at each address. This data is crucial to have a reliable and equivalent comparison between the different addresses / construction methods since this temperature data allows us to analyze and compare thermal images with the same coefficient / insulation index. The areas identified in blue on the infrared images in this report therefore represent the gaps / thermal losses detected according to the same insulation index. This insulation index is calculated based on the interior and exterior temperatures measured during the inspection in order to compensate for temperature variations between inspections. This allows us to compare each address and each method on the same level of equality (comparing apples with apples).

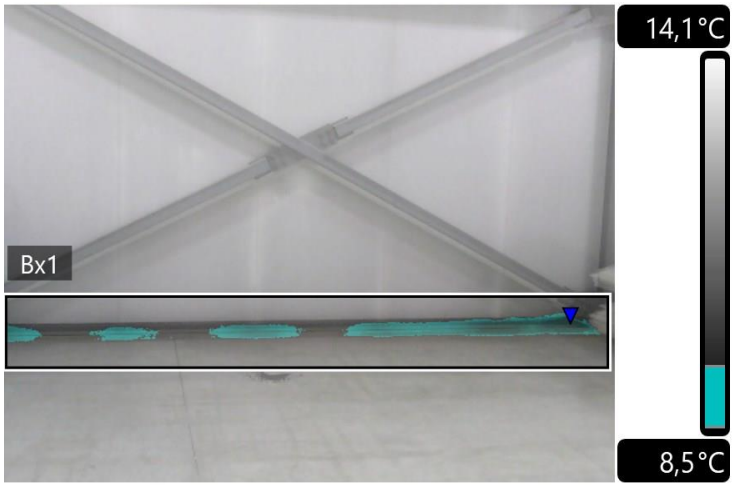
Summary results :

Modular Insulating Panels: The panels appeared to be well insulated and fairly airtight overall. One panel facade did not show any anomalies or loss of insulation/watertightness when joined end-to-end with other panels. The weak points observed were mainly at the junctions with other components (foundation, roof, door frame, etc.) or with other facades of different materials (such as the brick wall you will see below). There were several losses of airtightness/insulation in these cases. Note that modular insulating panels are installed on the surface of a steel structure that remains visible on the inside, which can present anomalies similar to the weak points observed with thermal imaging on a conventional construction (several possibilities of thermal bridges, air infiltration, etc.). You will be able to see a thermal bridge and air infiltration at the bottom of the inspected facades where the panel meets the foundation. There was also a lot of air infiltration near the doors. Some corners also showed slight thermal loss. The greatest air infiltration was found at a junction with a brick wall. It appeared as if the junction between the brick and panel facades was not sealed/insulated perfectly. In terms of insulation performance alone, the panels were better than conventional ones, but slightly worse than the blocks.

Rapid Bloc (block on block): The block on block construction method (using 1 or 2 rows of blocks as foundation) is the most waterproof and efficient method observed during this thermographic inspection day. This method avoided losses of waterproofing and insulation and helped to greatly reduce the effect of thermal bridging with the outside temperature. This construction method is the best solution according to our thermal imaging observations in terms of thermal / energy efficiency. Building the foundation in blocks greatly reduces or even eliminates in many cases losses of waterproofing and thermal bridges. Therefore, the floor of the building and the lower section of the facade remain warmer, which should considerably increase the overall energy efficiency of the building and reduce heating costs. In addition, the thickness of the blocks seems to help to further cut thermal bridges and air infiltration due to the fenestration. The coolest points observed on a block facade were the windows (which is normal since they are less well insulated than the blocks, in addition to the fact that the metal frame conducts more temperature (thermal bridge)). The thermal bridge around the doors and windows and the air did not infiltrate as much and not in as large a volume as the other construction solutions observed. The blocks did not present thermal losses with the roof junctions, corners or other.

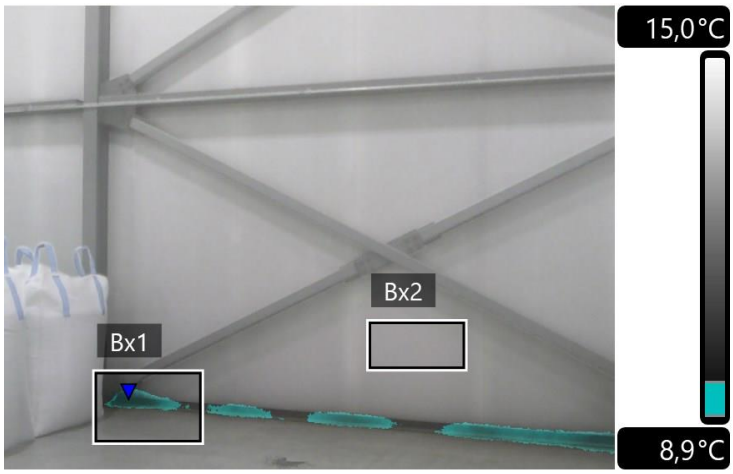
Exterior Modular Insulating Panels:

Modular Insulating Panels:



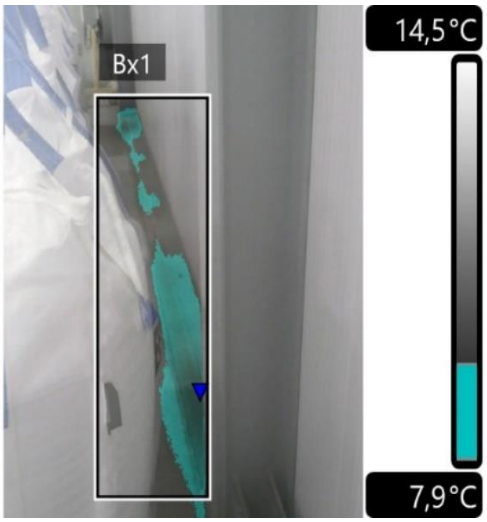
Bx1 Average	10,7 °C
Bx1 Maximum	12,1 °C
Bx1 Minimum	8,2 °C

Air infiltration and insulation loss under the junction of the façade panel wall to the slab/foundation. These air infiltrations and thermal bridges are present almost along the entire length of the façades in this configuration. This cools the floor in front of the junction and should reduce the overall energy efficiency of the building.



Bx1 Minimum	8,3 °C
Bx2 Average	12,4 °C

Air infiltration and insulation loss under the junction of the façade panel wall to the slab/foundation. These air infiltrations and thermal bridges are present almost along the entire length of the façades in this configuration. This cools the floor in front of the junction and should reduce the overall energy efficiency of the building.



Bx1 Maximum	14,0 °C
Bx1 Average	10,9 °C
Bx1 Minimum	7,4 °C

Air infiltration and insulation loss under the junction of the façade panel wall to the slab/foundation. These air infiltrations and thermal bridges are present almost along the entire length of the façades in this configuration. This cools the floor in front of the junction and should reduce the overall energy efficiency of the building.

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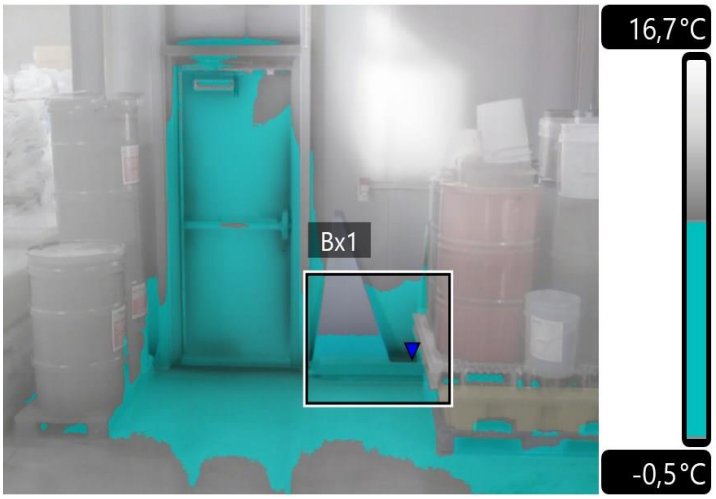
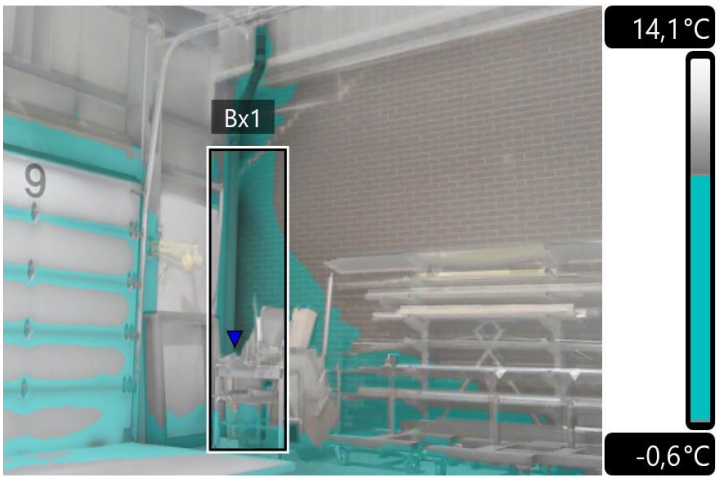
Modular Insulating Panels:



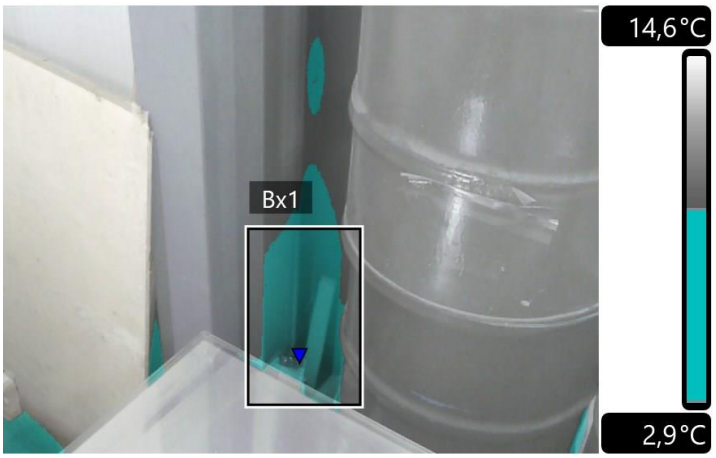
Bx1 Average	8,3 °C
Bx1 Maximum	11,9 °C
Bx1 Minimum	-7,7 °C

Significant air infiltration around door frames. Cold air appears to be infiltrating at high volumes around the frame and in front of the door. It is possible that the problem originates from the door and not the facade cladding, but air infiltration was less severe in the block buildings inspected.



Bx1 Average	7,8 °C
Bx1 Maximum	14,1 °C
Bx1 Minimum	-4,4 °C

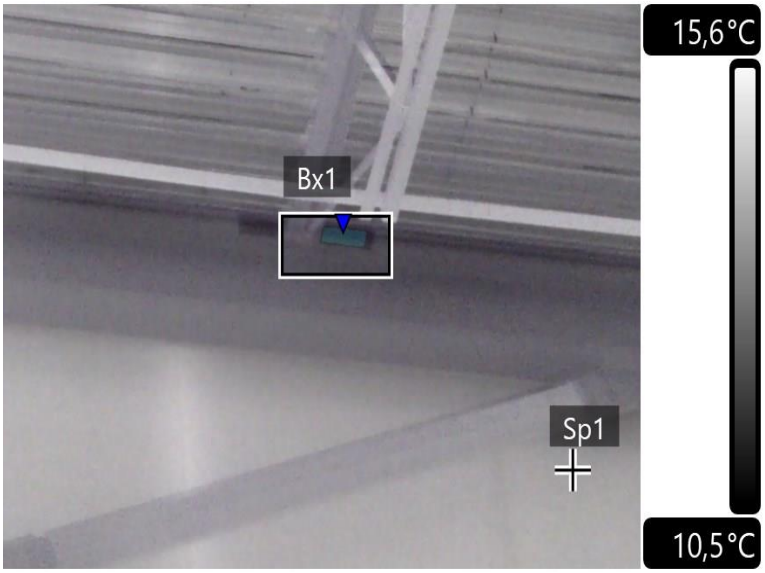
The junction between the brick wall and the prefabricated panels is not perfectly sealed or sufficiently insulated. You can see significant air infiltration throughout the brick wall coming from the corner of the junction between the two facades.



Bx1 Average	8,7 °C
Bx1 Maximum	13,2 °C
Bx1 Minimum	-1,1 °C

Loss of insulation and/or air infiltration to the right of an interior corner of the facades. This is the corner to the left of the door shown in the first photo on this page.

Modular Insulating Panels:

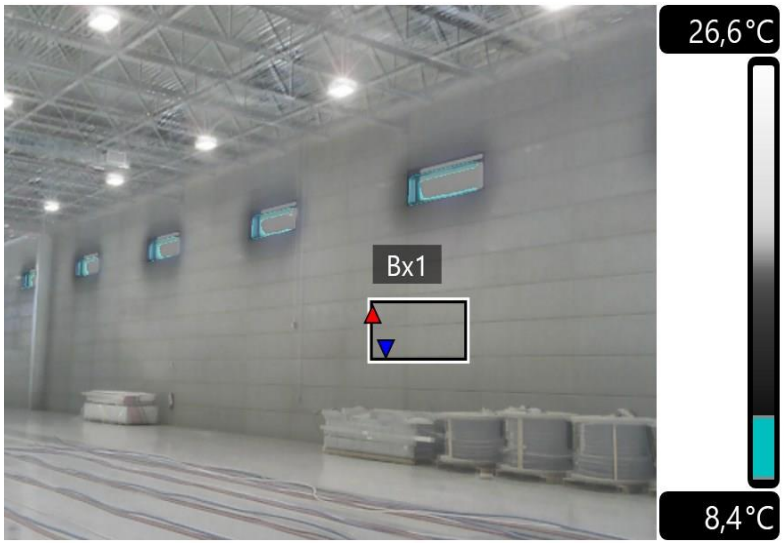


Sp1	13,6 °C
Bx1 Average	11,3 °C
Bx1 Maximum	15,0 °C
Bx1 Minimum	7,3 °C

There appeared to be a loss of insulation at the junction between the roof and the facade.

Exterior Rapid Bloc - Blocks on blocks:

Rapid Bloc - Blocks on blocks:

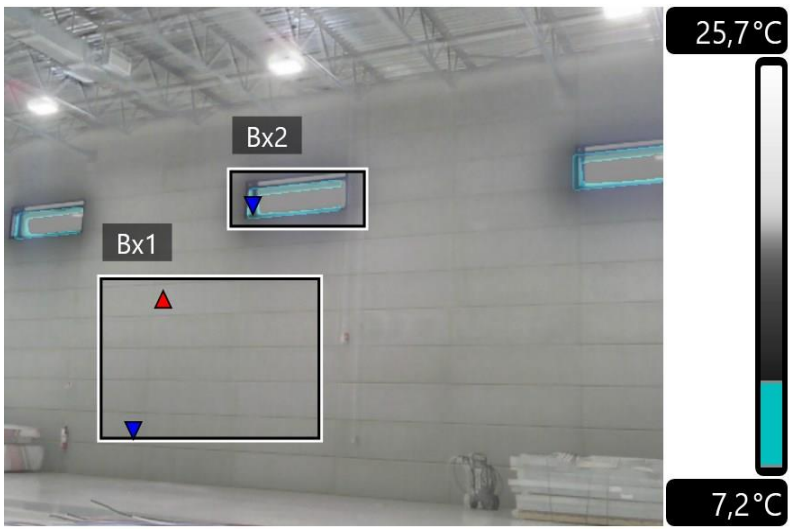


Bx1 Average	18,3 °C
Bx1 Maximum	18,5 °C
Bx1 Minimum	18,0 °C

We can see that the average surface temperature of the block wall is higher than the other 2 construction methods illustrated previously. The insulation R-value of the blocks appears to be higher than both panels and conventional walls.

Sp1	18,4 °C
Bx1 Average	12,7 °C
Bx1 Maximum	18,5 °C
Bx1 Minimum	0,4 °C

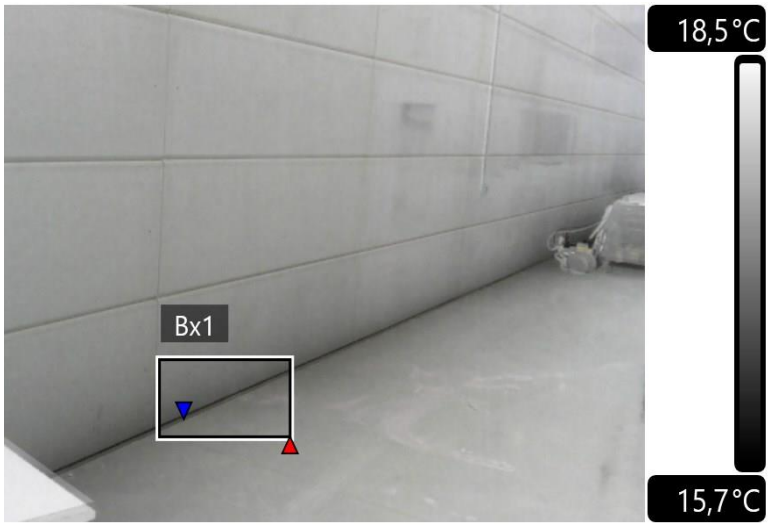
The only thermal bridges detected are those of the window frames, which is fairly standard since the frame is made of metal and therefore conducts the outside temperature, but the thermal bridge does not seem to pass through the blocks which keeps air infiltration and heat loss to a minimum.



Bx1 Average	18,1 °C
Bx1 Maximum	18,5 °C
Bx1 Minimum	17,3 °C
Bx2 Minimum	3,2 °C

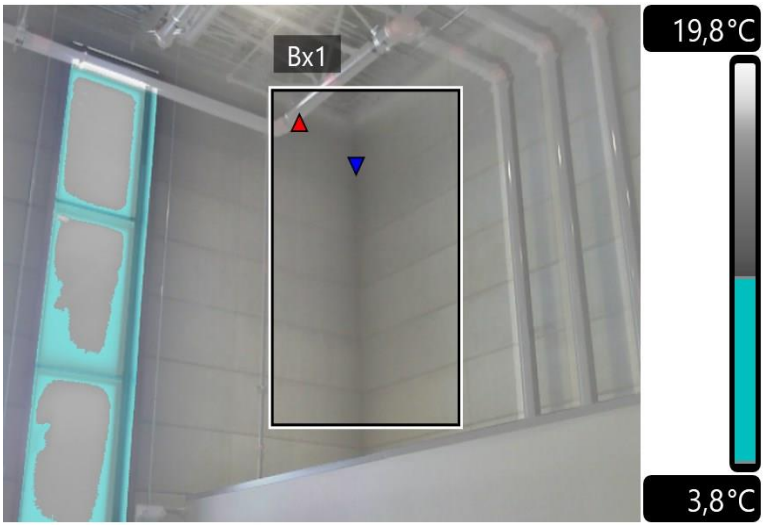
Once again, we can see the temperature of the window frame being cold, but it does not spread into the concrete cladding as much as it does in conventional cladding. The block wall does not appear to be experiencing any insulation loss or air infiltration.

Rapid Bloc - Blocks on blocks:



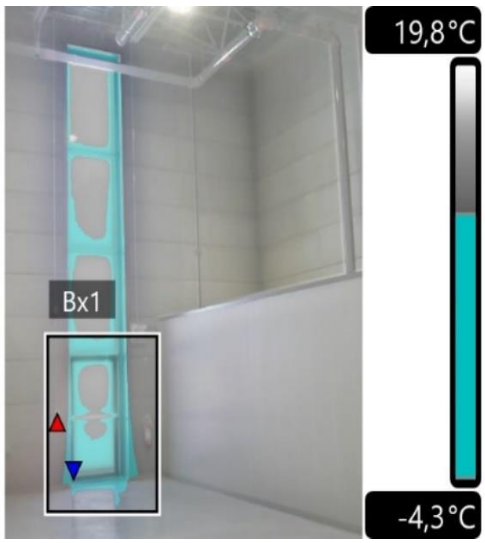
Bx1 Average	16,5 °C
Bx1 Maximum	17,2 °C
Bx1 Minimum	15,4 °C

The bottom of the blocks does not present any heat loss or air infiltration since there is another row of blocks below it which acts as the foundation of the building. The fact that these are blocks stacked up to the ground limits heat loss and air infiltration which seems to greatly improve the airtightness of the facade and the energy efficiency of the building.



Bx1 Average	17,4 °C
Bx1 Maximum	19,3 °C
Bx1 Minimum	15,9 °C

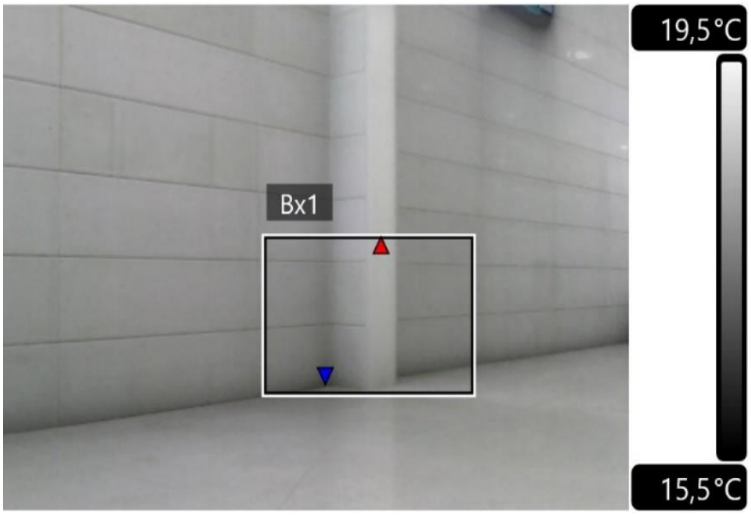
We can see that the temperature of the corner is quite warm and the corner/junction between the 2 facades does not seem to present any thermal losses and/or sealing losses.



Bx1 Average	10,7 °C
Bx1 Maximum	16,9 °C
Bx1 Minimum	-8,5 °C

Air infiltration around the door frame is limited to the front of the door. It appears to be less significant when the cladding is constructed of blocks on blocks, unlike other construction methods.

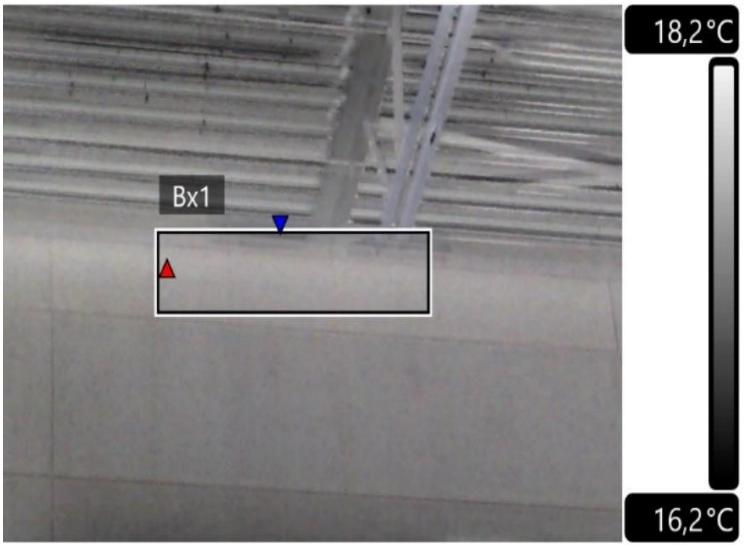
Rapid Bloc - Blocks on blocks:



Bx1 Average	17,3 °C
Bx1 Maximum	18,9 °C
Bx1 Minimum	15,4 °C

As before, we can see that there is no air infiltration and thermal losses at the bottom of the blocks and even between the junctions of the intersecting blocks.

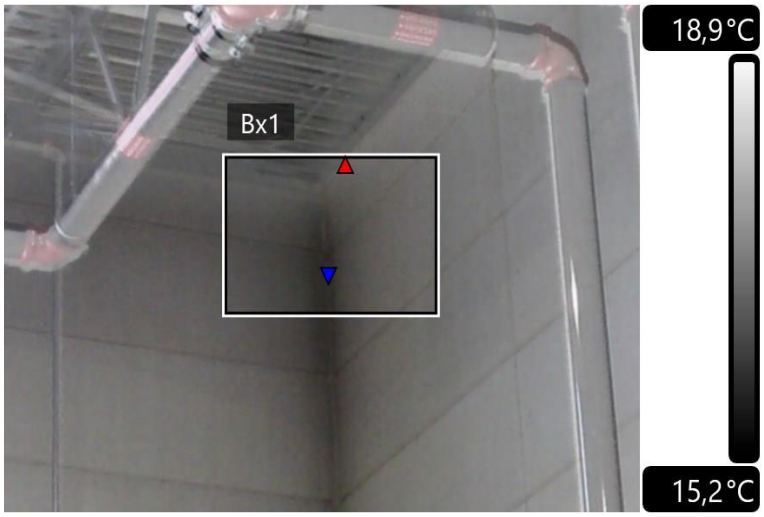
We used a lens with a higher zoom to analyze the thermal bridge / possible air infiltration around the windows. As you can see, there does not appear to be any air infiltration and the thermal bridge is limited to the metal only.



Bx1 Average	17,9 °C
Bx1 Maximum	18,2 °C
Bx1 Minimum	17,4 °C

There did not appear to be any insulation loss at the junction between the facade and the roof of the building.

Rapid Bloc - Blocks on blocks:



Bx1 Average	16,3 °C
Bx1 Maximum	17,1 °C
Bx1 Minimum	15,0 °C

Here is a triple corner (junction between 2 facades and junction with the roof) we can see that there does not seem to be any thermal losses at this level. It is quite rare in conventional construction to have corners without losses unlike block construction as illustrated.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ISSUE DATE: 11/04/2023
EXPIRATION DATE: 11/04/2028
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Certificat d'étalonnage / Calibration Certificate

Client/Customer: *Le Thermographe*

Certificat/Certificate: C666327-00-01

Identification de l'unité / Unit Identification

Fabricant/Manufacturer: **Flir**
Série/Serial: **89002541**
Modèle/Model: **T560**
ID de l'unité/Unit ID: **N/A**
Description: **Thermal Imager**

Date d'étalonnage / Calibration Date

Date d'étalonnage/Cal Date: **22-May-2024**
Échéance/Due Date: **22-May-2025**

Conditions d'étalonnage / Calibration Conditions

Température/Temperature: **21.74°C**
Humidité/Humidity: **48.04 %**
Pression barométrique/Barometric Pressure: **N/A**

Information générales / General Information

Commentaire/Remark:N/A

Étalons utilisés / Standards Used

ID de l'unité / Unit ID	Fabricant / Manufacturer	Modèle / Model	Date d'étalonnage / Cal Date	Date Due / Due Date
INV114	Fluke	4180	12-Aug-2023	12-Aug-2026
INV115	Fluke	4181	10-Feb-2022	10-Feb-2025

L'étalonnage a été effectué à l'aide d'étalons qui ont été vérifiés par rapport à ceux de l'Institut des Étalons Nationaux de Mesure (IÉNM) du Conseil National de Recherches du Canada (CNRC) ou à ceux du National institute of Standards and Technology (NIST) des États-Unis, et/ou ont été dérivés de constantes physiques de base et/ou par technique d'autoétalonnage proportionelle. L'incertitude d'étalonnage indiqué dans ce rapport est obtenue en utilisant un facteur de couverture de k=2 selon un degré de confiance d'environ 95%.

The calibration was performed using measurement standards traceable to the National Measurement Institute Standards (NMIS) part of the National Research Council of Canada (NRC) or the National Institute of Standards and Technology (NIST), or to accepted instrinsic standards or measurement, or is derived by ratio type self-calibration techniques. Measurement uncertainties given in this report are based on a coverage factor of k=2 corresponding to a confidence level of approximately 95%.

Étalonné par/Calibrated by: ***M. Srougi-Nguyen***

Approuvé par/Approved by:

Thanks :

Le Thermographe Thermal Analysis Service would like to thank you for choosing us and trusting us with the inspection of your electrical installations.

We hope everything meets your expectations.

If you are satisfied with our service, please don't hesitate to contact us for a future inspection!

Sincerely,
From the entire team at Le Thermographe.