

# Rendimiento energético y confort en las escuelas LEON van GELDER

Investigación sobre el Confort y la Eficiencia Energética en Edificios

## Comfort Climate and Energy Performance at Leon van Gelder School

### Research in Comfort and Energy Efficiency in Buildings



The Leon van Gelder College is a public secondary school for education. The building was designed by the architect Thomas Rau, and it was constructed in 2004 and completed the beginning of 2005.

It was built keeping in mind the **sustainability and innovations of energy efficient**, they wanted that this was one of **the lowest power consumption** of all the schools in Groningen.

The heating system of the building is working with a **heat pump** combined with concrete core activation which should provide a smooth and pleasant heated or cooled building, and the construction us composed of a column structure in combination with a monolithic floor.

This building has different types of facade with curtain wall and with profiled steel plate with a insulation of glass wool or rock wool.

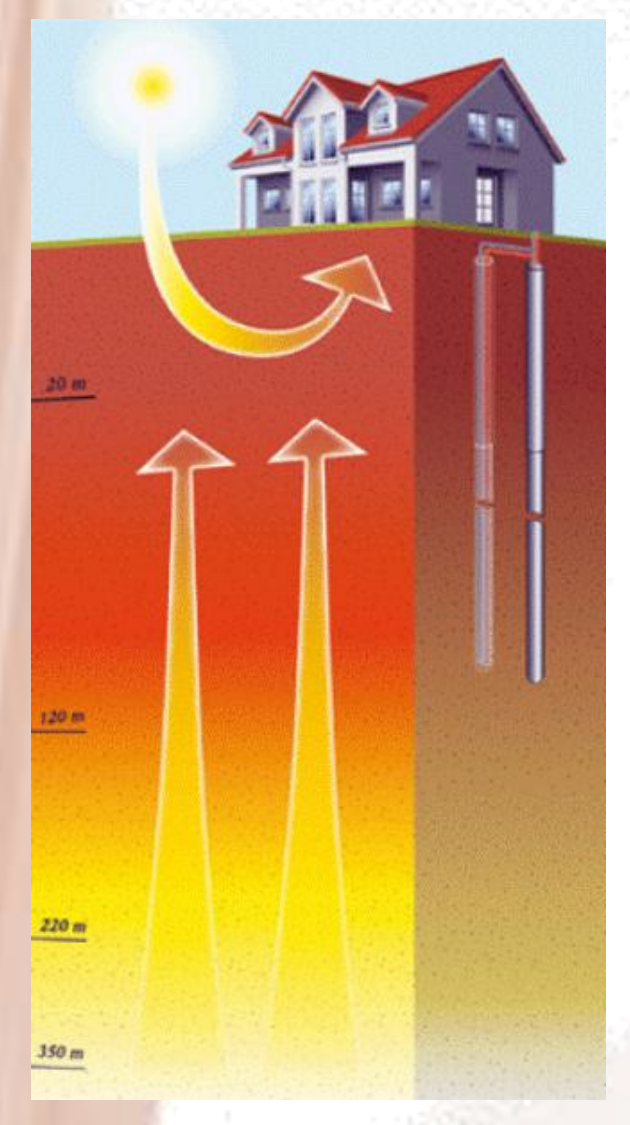
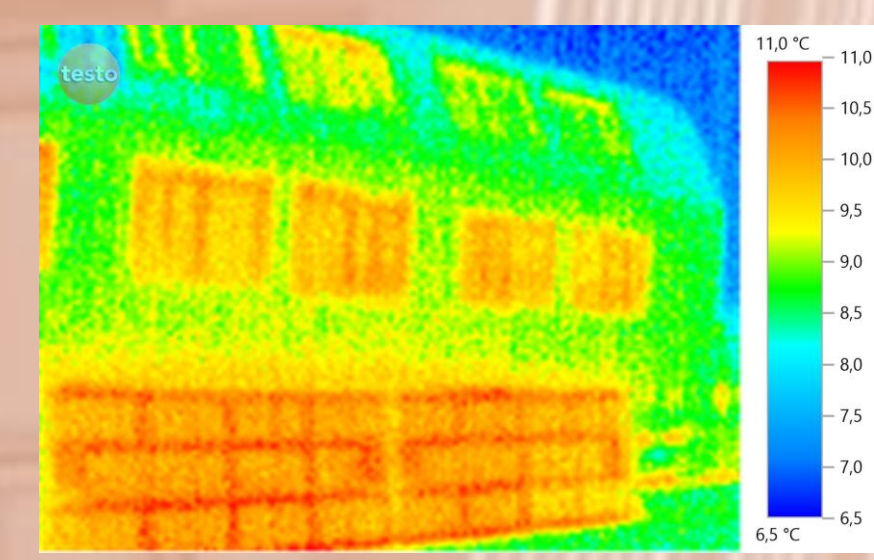
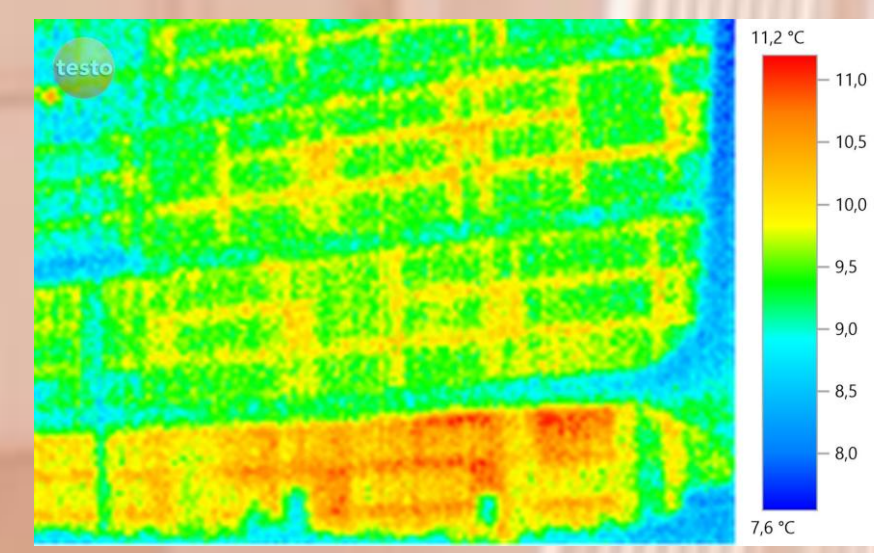
The first idea when O2G2 thought about built this school, they wanted to built the lowest power consumption in the city of Groningen, but it was just the opposite, one of **the most expensive school** in terms of energy consumption O2G2, therefore **it doesn't fulfill the required standards for the sustainability** rules and normative of the buildings and the goals for the original project.

**It was built as energy efficient building as a goal, but is exactly the opposite.**

### WHAT ARE THE FACTORS RESPONSIBLE OF THE HIGH ENERGY CONSUMPTION AND DISCOMFORT OF THE LEON VAN GELDER SCHOOL?

- Thermal isolation in the envelope
- Heat lost by infiltration in winter
- Orientation of the building
- Allow entry sun in winter
- Use of the heating and cooling systems
- Temperature inside the building
- Ventilation
- Humidity
- Filtration and air cleaning
- Air velocity
- Heat transfer
- Sound proofing
- Acoustic conditioning

INFLUENCE OF BUILDING DESIGN  
INFLUENCE OF THERMAL QUALITY FACADE  
INFLUENCE INSTALLATION SYSTEMS.  
CONCEPT AND USE

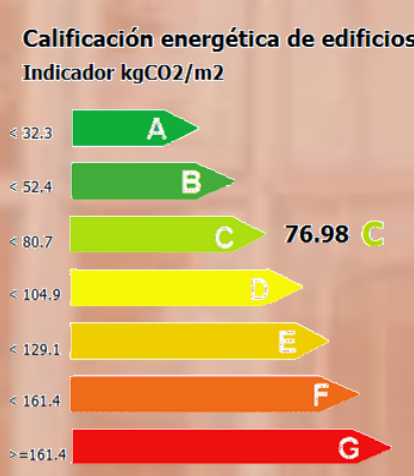


Heat bridges at the windows and in some points at the facades

Heat system by heat pumps does not work

### ENERGY PERFORMANCE CERTIFICATE

We can determine that the condition of the energy efficient at the building is not the best. It should reach at least the A level, as the goal it was built



DEMANDA DE CALEFACCIÓN		DEMANDA DE REFRIGERACIÓN	
< 10.2 A		< 1.8 A	
10.2-18.7 B		1.8-3.5 B	
18.7-30.6 C		3.5-5.9 C	
30.6-40.8 D		5.9-8.0 D	
40.8-51.1 E		8.0-10.1 E	
51.1-64.7 F		10.1-12.8 F	
> 64.7 G		> 12.8 G	
<b>21.71 C</b>		<b>9.83 E</b>	
<b>Demanda global de calefacción [kWh/m² año]</b>	<b>21.71</b>	<b>Demanda global de refrigeración [kWh/m² año]</b>	<b>9.83</b>

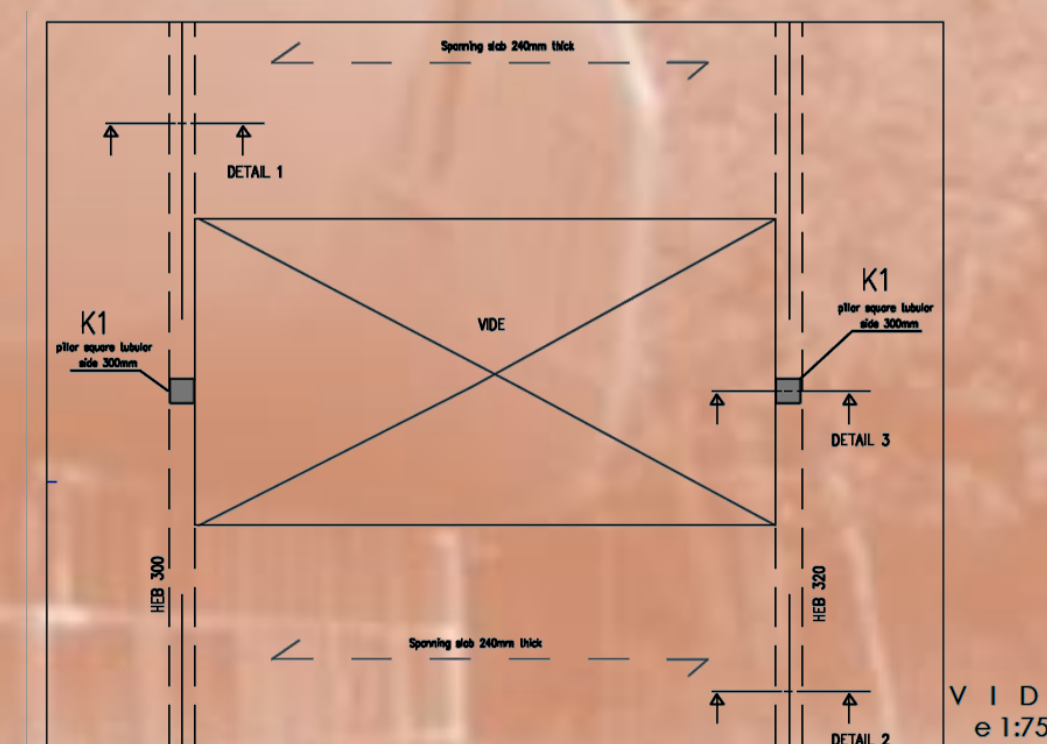
### IMPROVEE COMFORT AT THE STAAF ROOM AND VIDE



### Comfort Problems with:

- Ventilation
- Drafts
- Heating system
- Heating loses
- Bad insulation

-In addition, there are a hole (Vide) that was suppose to be close for have more space. We close it with **glass floor and steel structure**



### VIDE SOLUTION DETAILS

