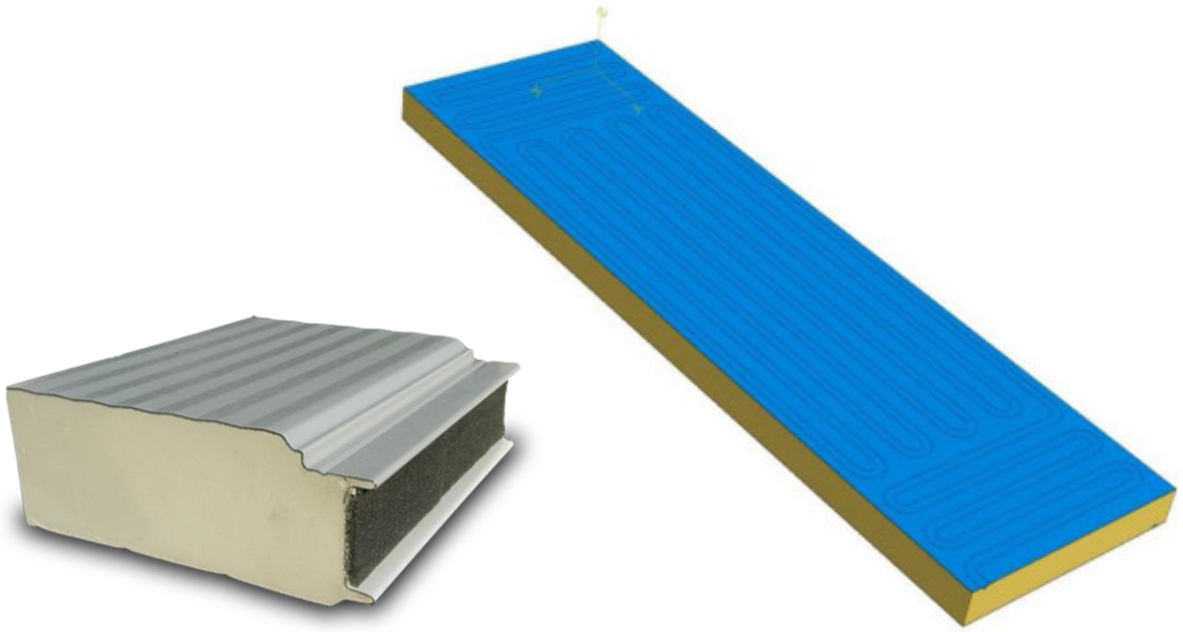
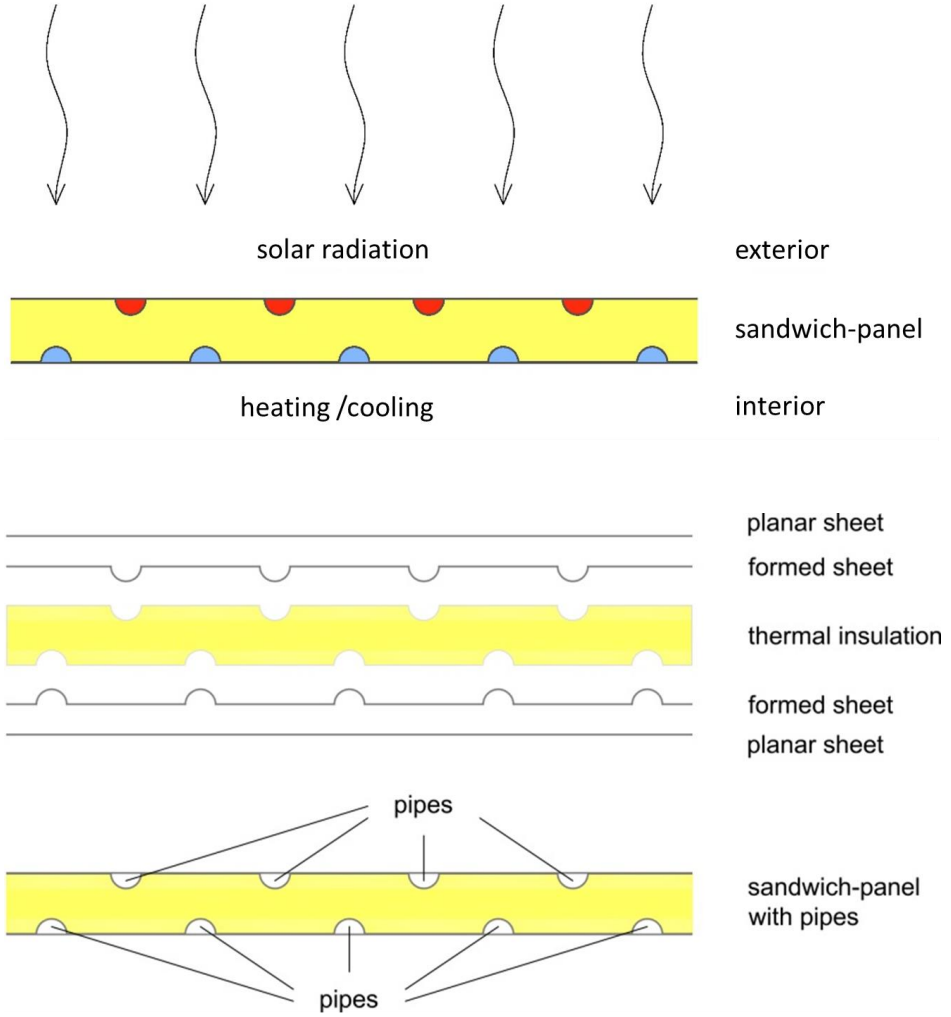
THERMAL ANALYSIS FOR THE DEVELOPMENT OF A SOLAR THERMALLY ACTIVATED FACADE ELEMENT



Traditional sandwich panels are one of the cheapest and easiest solutions forming the thermal building envelope for industrial building constructions. They are prefabricated façade elements where millions of square meters were produced and mounted every year. The central idea of the Interreg project “ABS-Network SIAT 125” is the solar thermally activation.



Solar Thermally Activated Facade Element (cross section)

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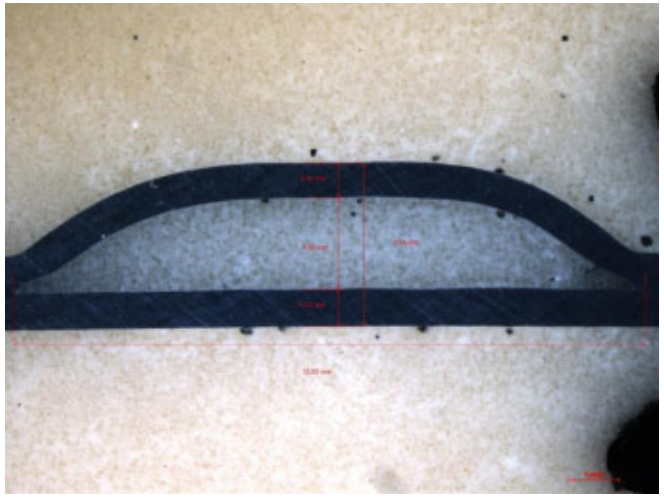
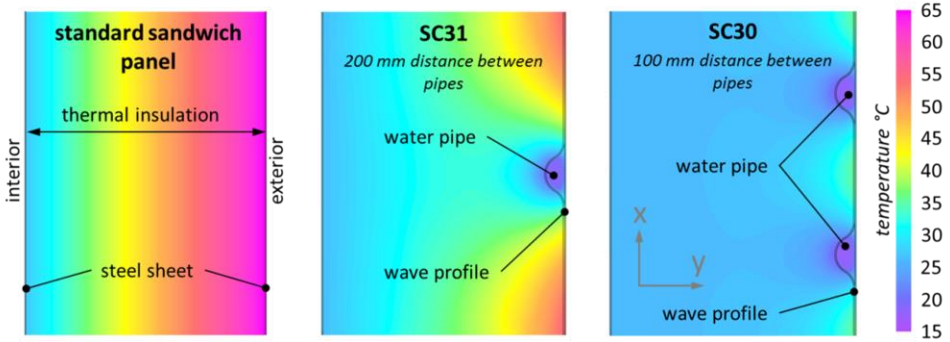
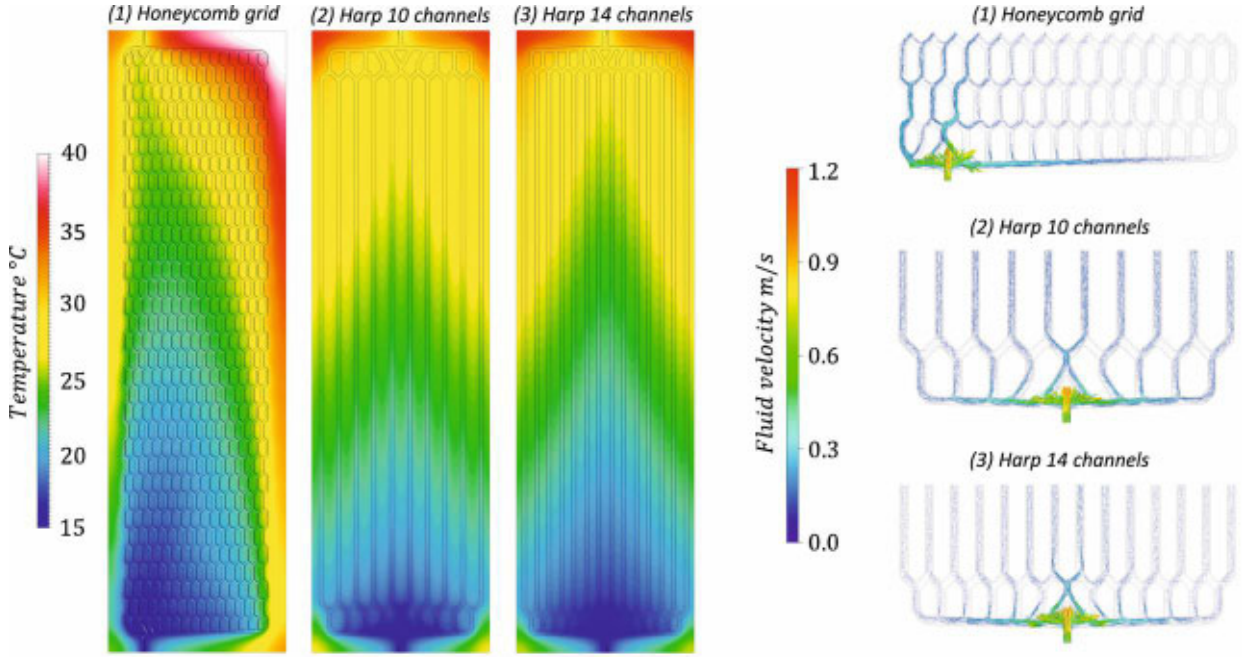




Comparison of the temperature contours between a standard sandwich panel and the thermally activated panel



		double side inflated	one side inflated	one side inflated
		Honeycomb grid	10 channel harp	14 channel harp
Fluid outlet temperature	°C	27.8	27.7	27.9
Maximum exterior steel plate temperature	°C	42.8	35.6	35.9
Average exterior steel plate temperature	°C	25.1	24.4	24.0
Energy output	W	744.6	739.9	750.3
Pressure difference between inlet and outlet	Pa	1056.3	1599.5	1423.7

Comparison of the temperature contours at the exterior metal plate and the fluid flow characteristic at the inlet region for a Thermally Activated Sandwich Panel with (1) a honeycomb grid, (2) a 10 channel harp and (3) a 14 channel harp fluid pipework.

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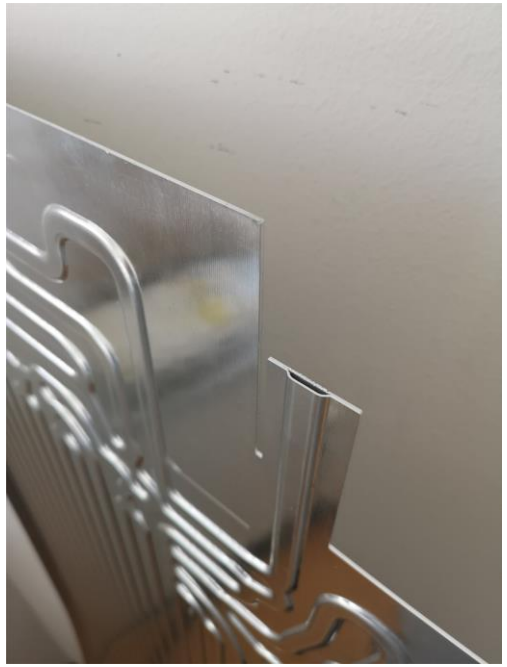

Prototype of the Solar Thermally Activated Façade Panel. Left: Cross section of the absorber plates after the Roll bonding process (Talum d.d.); Middle: Prototype after joining the absorbers with an insulation core of Polyurethane an Mineral Wool (Brucha GmbH); Right: Test facility at Inffeldgasse, Graz University of Technology, for testing the Solar Thermally Activated Façade Panel under real climate conditions.