

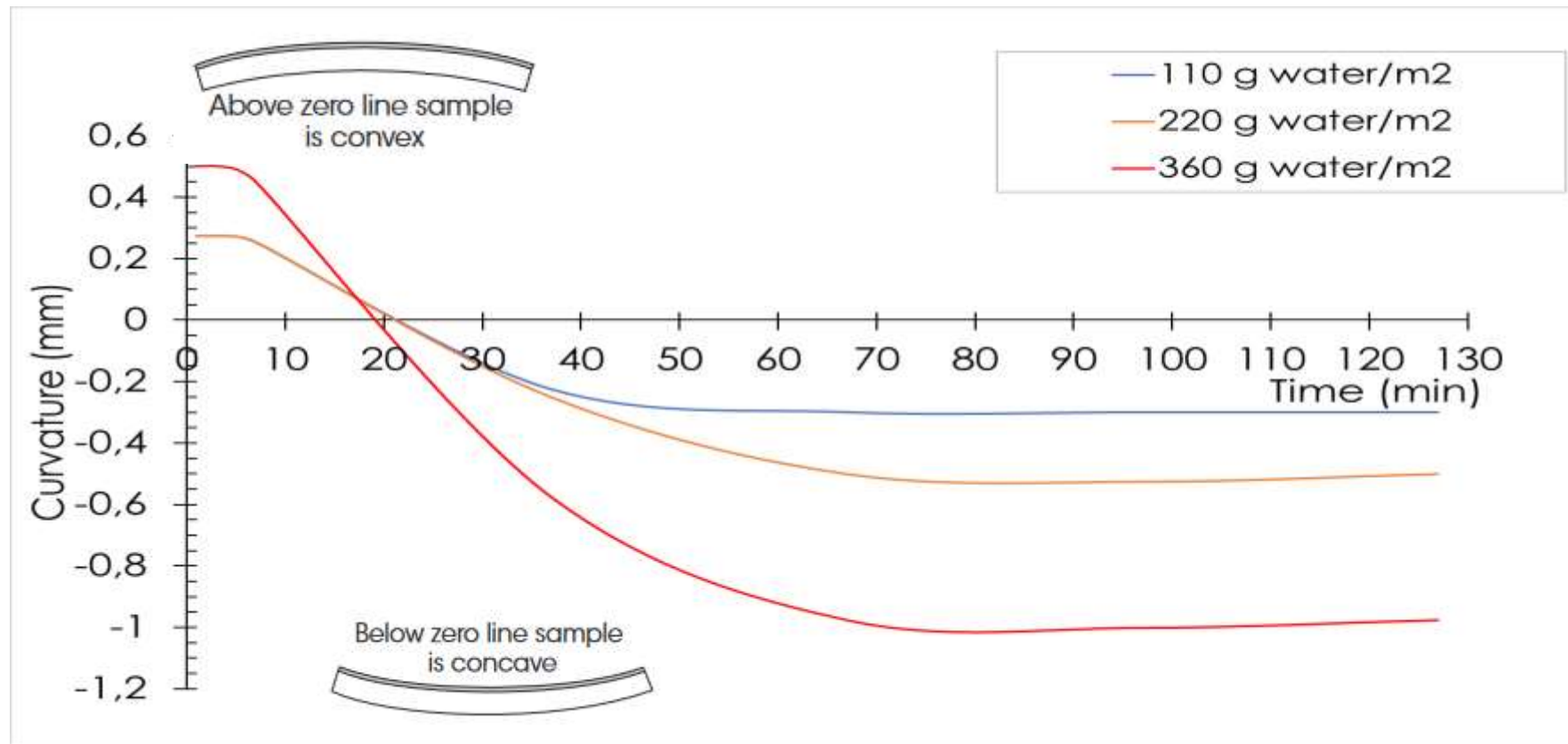
Hydro-deformation

Curvatures in green ceramic bodies



2. Hydro-Deformation: Manufacturing problems

Hydro-deformation: The curvatures, that are seen in green bodies along the glazing/decoration line and before firing.



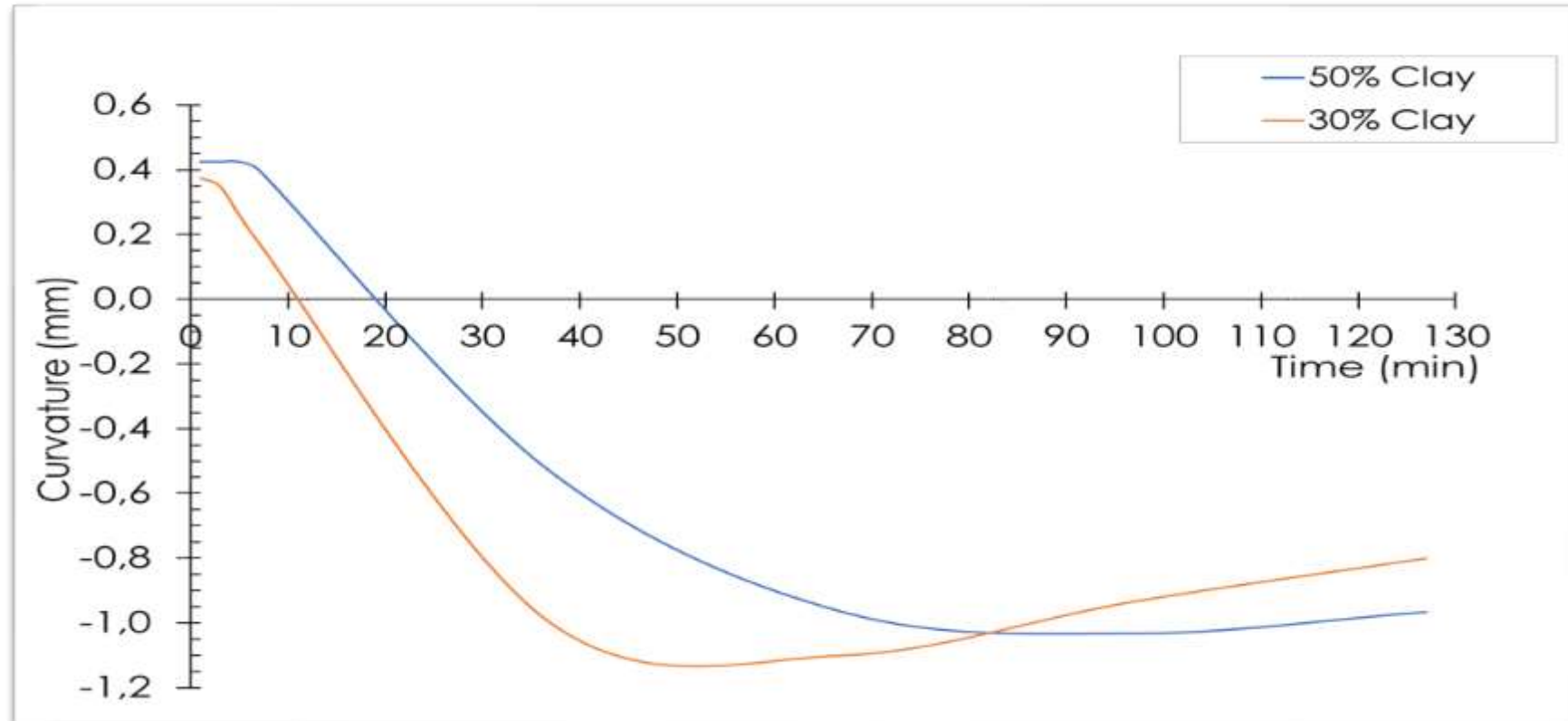
Curvatures vs time with different amounts of water applied on the surface of green porcelain bodies

2. Hydro-Deformation: Manufacturing problems

- These curvatures cause serious problems, such as:
 - Cracks in the enamel layer
 - Irregular printing
 - Breaking parts
 - Difficulty to take pieces out of boxes
 - Misalignment of pieces into the kiln
- Companies are not able to produce large formats and thinner tiles due to the curvatures in green bodies.

3.1 Influence of body characteristics

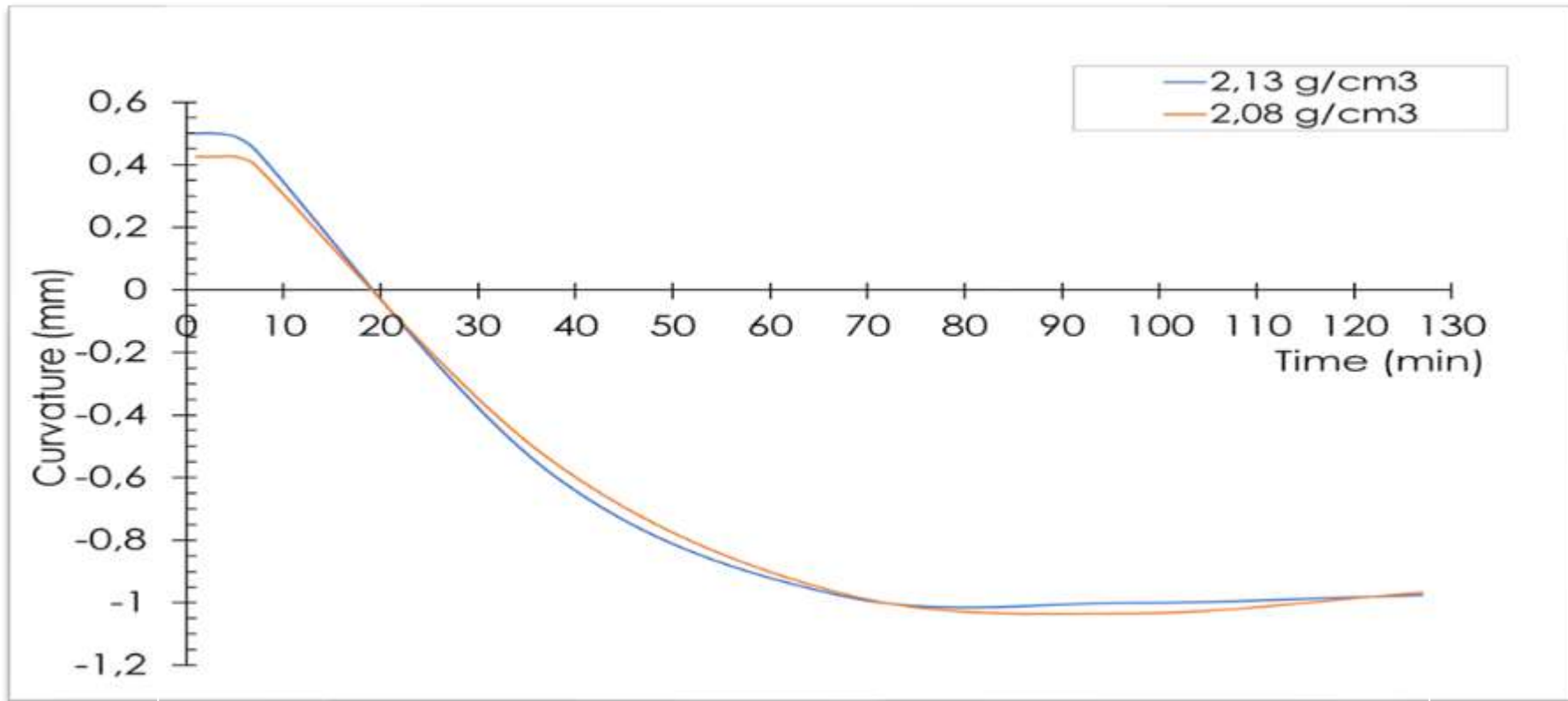
Clay percentage in ceramic body



Higher amounts of clay lead to higher convex deformation, because there is an expansion of the clay, but less concave deformation due to slower drying of the body.

3.2 Influence of body characteristics

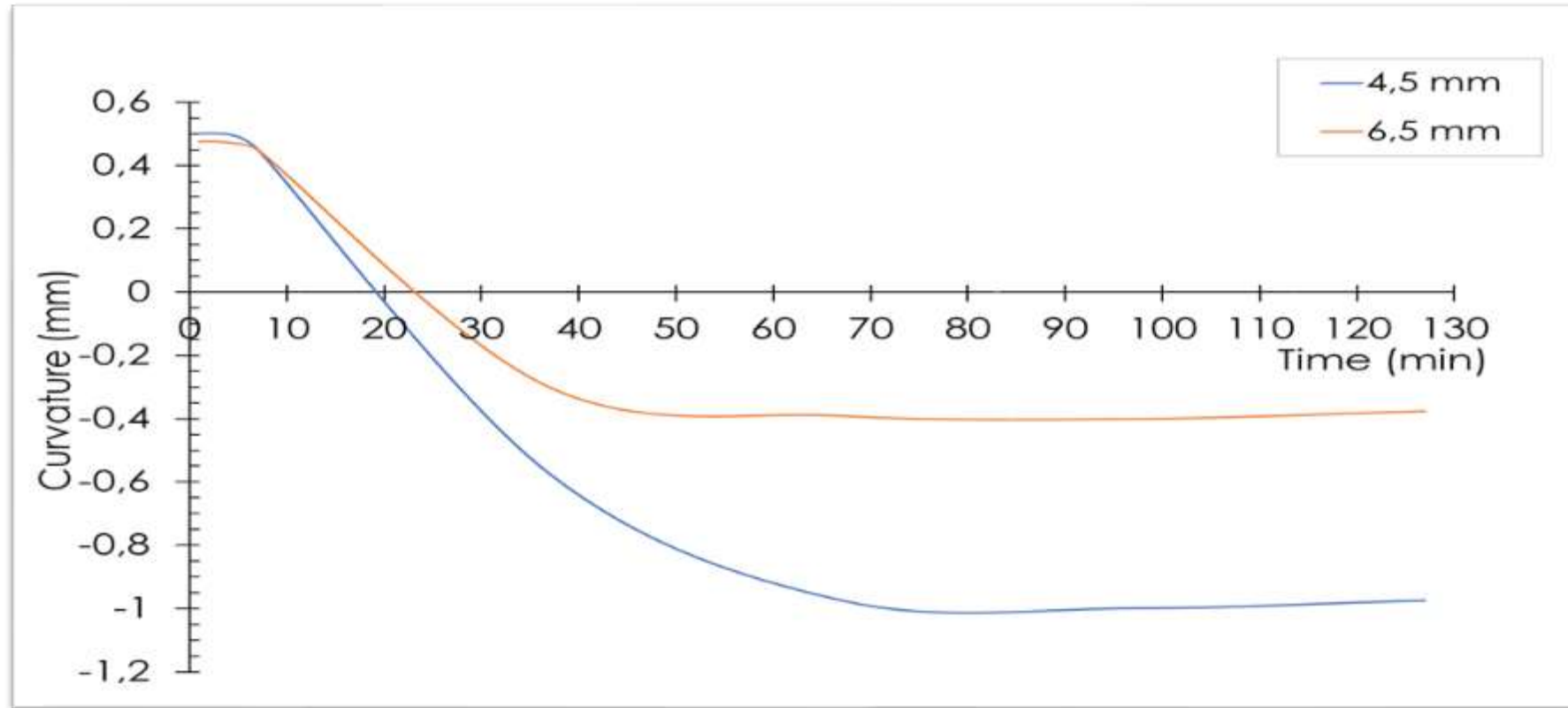
Apparent density of ceramic body



Apparent density does not modify the curvatures.

3.3. Influence of body characteristics

Thickness of ceramic body



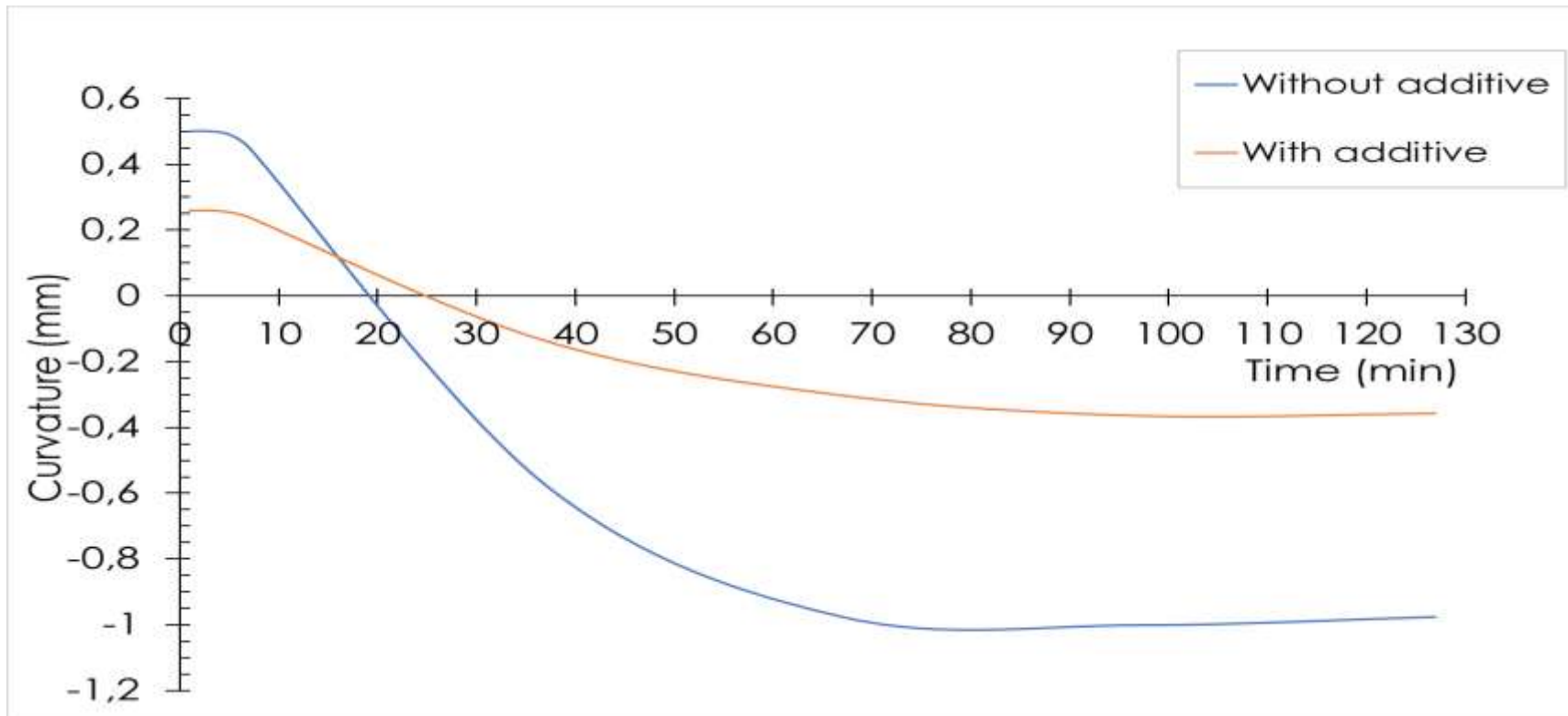
Curvatures depend on thickness. Low thickness leads to higher deformation.

4. Solution

- An additive that is applied by spraying on the surface of the dry bodies, after the dryer, instead of the water that is usually used to cool the warm bodies.
- The amount applied is the same as the amount of water, that is about 110 g/m^2 .
- The additive controls the kinetic of water through the body.

4. Solution

Curvatures in bodies vs time (with & without FY-005 additive).



4. Solution

The application of FY-005 additive:

	Convex curvature (mm)*	Concave curvature (mm)*
Without Additive	0,50	-1,0
Using FY-005	0,26	-0,36
Reduction of Curvature	50%	60%

* Maximum values

5. Conclusions

- Reduces the curvatures in green bodies.
- No modify the ceramic composition of the body.
- No add an extra application step.
- Low cost that allows red and white tile industry to use the additive.

Thank you

Innovations in body compositons

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