

Simulation on Dew Condensation on Sash

Case Study for a Sash Maker

Predict the dew formation by using humidity & dew condensation of scSTREAM

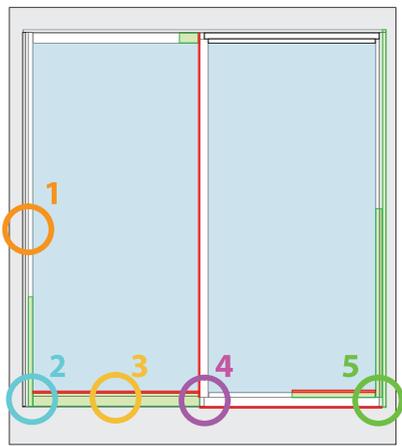
The Importance of Dew Condensation Prevention

Condensation can cause undesirable corrosion of building materials. An important part of the product development is to control and to prevent the dew formation by grasping the generation status of moisture. Analysis using Computational Fluid Dynamics (CFD) is performed using the same analysis conditions as the performance test (JIS A 1514) of condensation prevention with the use of a full-sized sash, and the results are compared to see the dew formation.

The result comparison (observation of anti-dew formation performance vs. scSTREAM)

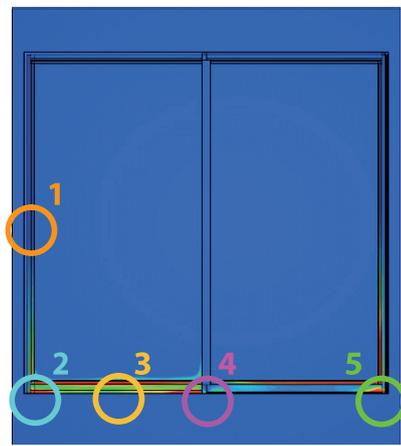
Testing / Analysis Condition			Part Property	
Constant temp room	Air temp	20°C	Sash	Aluminium
	Relative humidity	50%	Glass	Multiple glass (inner & outer panes: 6mm float glass, intermediate space: 6mm)
Low temp room	Air temp	0°C		

● Test Result



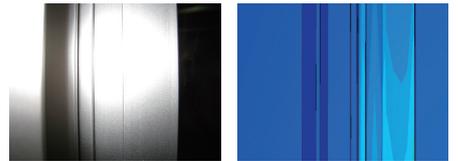
- Foggy: Dew droplets being too small to be seen
- Droplets: Dew droplets with average size less than 1mm but observable

● CFD Result

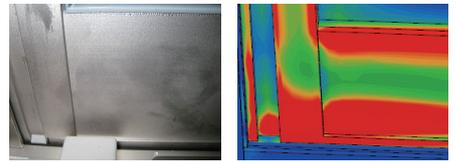


Total amount of dew formation
Low ■ ■ ■ ■ ■ High

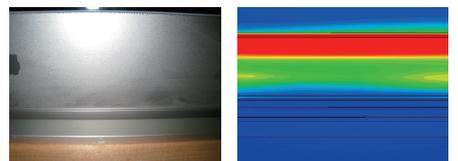
1. Middle of stile of outer sash



2. Bottom left of outer sash



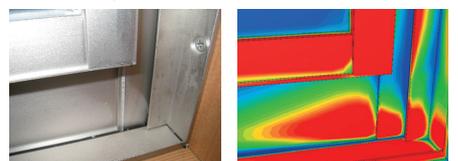
3. Middle of bottom stile of outer sash



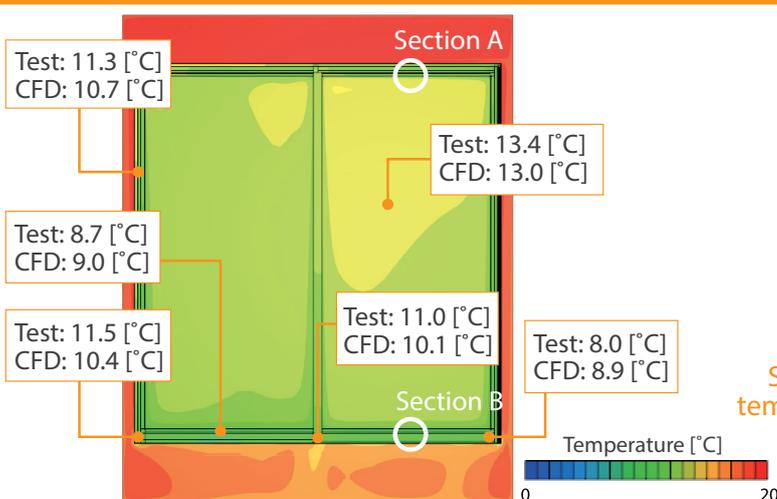
4. Near the meeting of bottom rail of outer sash



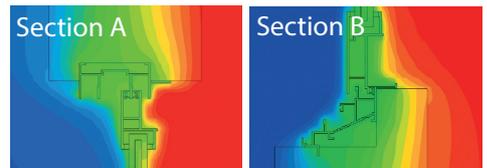
5. Bottom right of inner sash



Comparison of Sash Surface Temperature (test vs scSTREAM)



Section temperature



Customer Comments

In a comparison of dew formation between CFD result of scSTREAM and observation, a lot of condensation occurred on the rail of outer sash in both cases, showing high fidelity of scSTREAM. scSTREAM also predicted the surface temperature with very small difference, therefore, it should receive high commendation for it. I am well convinced that scSTREAM can contribute to predict the dew formation even where it is difficult to be observed since it provided an unprecedented degree of prediction in dew formation.