

Evaluation of different test methods for blistering

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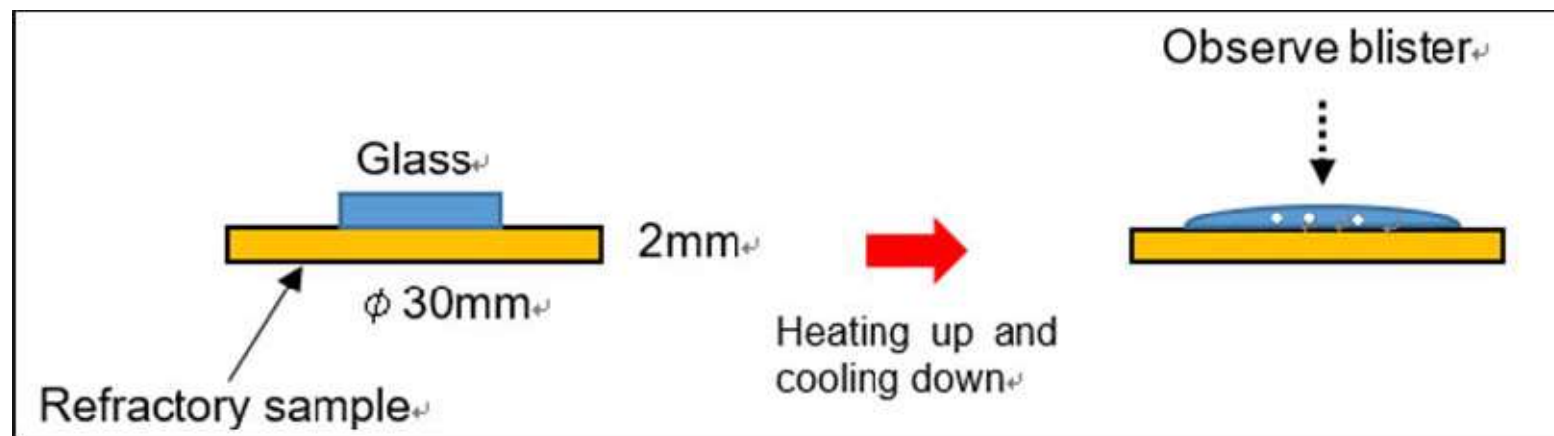
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AGC AGC CERAMICS CO., LTD.

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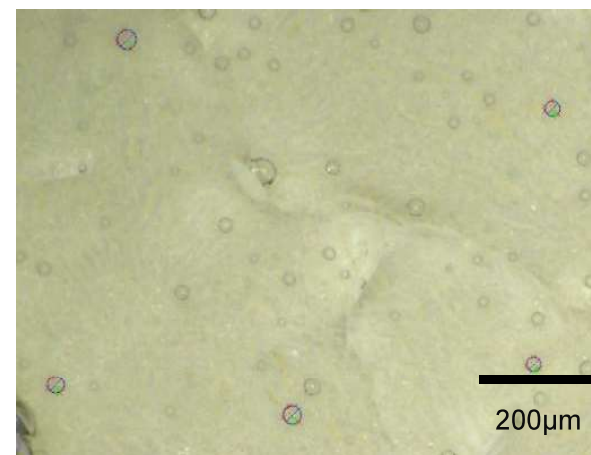
1) Disk method



Evaluation result (Soda Lime Glass, 1450°C, 1hr)



Sample after test



AZS

1) Disk method

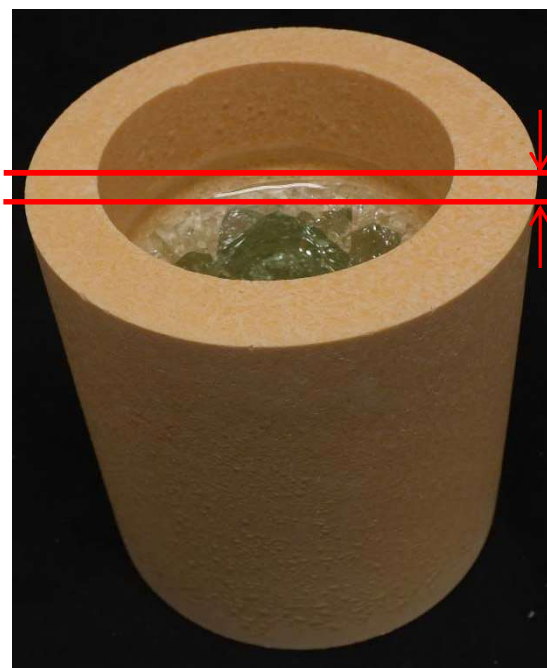
Feature

- Easy to test, quick evaluation

Challenge

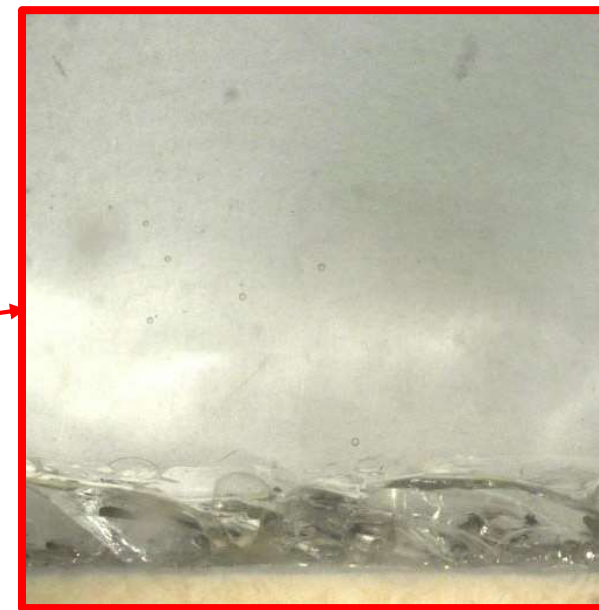
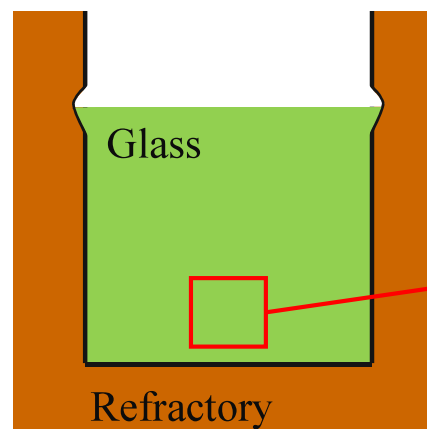
- No glass change → Only for short time test: e.g. $< 10\text{hrs}$

2) Crucible method



5mm

 Slice,
 Polish



1mm

Crucible with glass after test

Crucible size(TC11):

Height outside 100 mm

Height inside 85 mm

Diameter outside 100 mm

Diameter inside 70 mm

Height of glass bath 50 mm

Bottom thickness 15 mm

Evaluation result (Soda Lime Glass, 1450°C, 120hrs)

		Blister(pcs/cm ²)					
		AZS 33		AZS 36		AZS 41	
		A	B	A	B	A	B
Diameter of blister	< 0.05mm	-	-	-	-	-	-
	0.05- 0.1mm	11	1	9	5	2	13
	0.1 - 0.3mm	3	1	1	3	3	1
	0.3 - 0.6mm	0	0	0	0	0	0
	0.6 - 1.0mm	0	0	0	0	0	0
	> 1mm	0	0	0	0	0	0

2) Crucible method

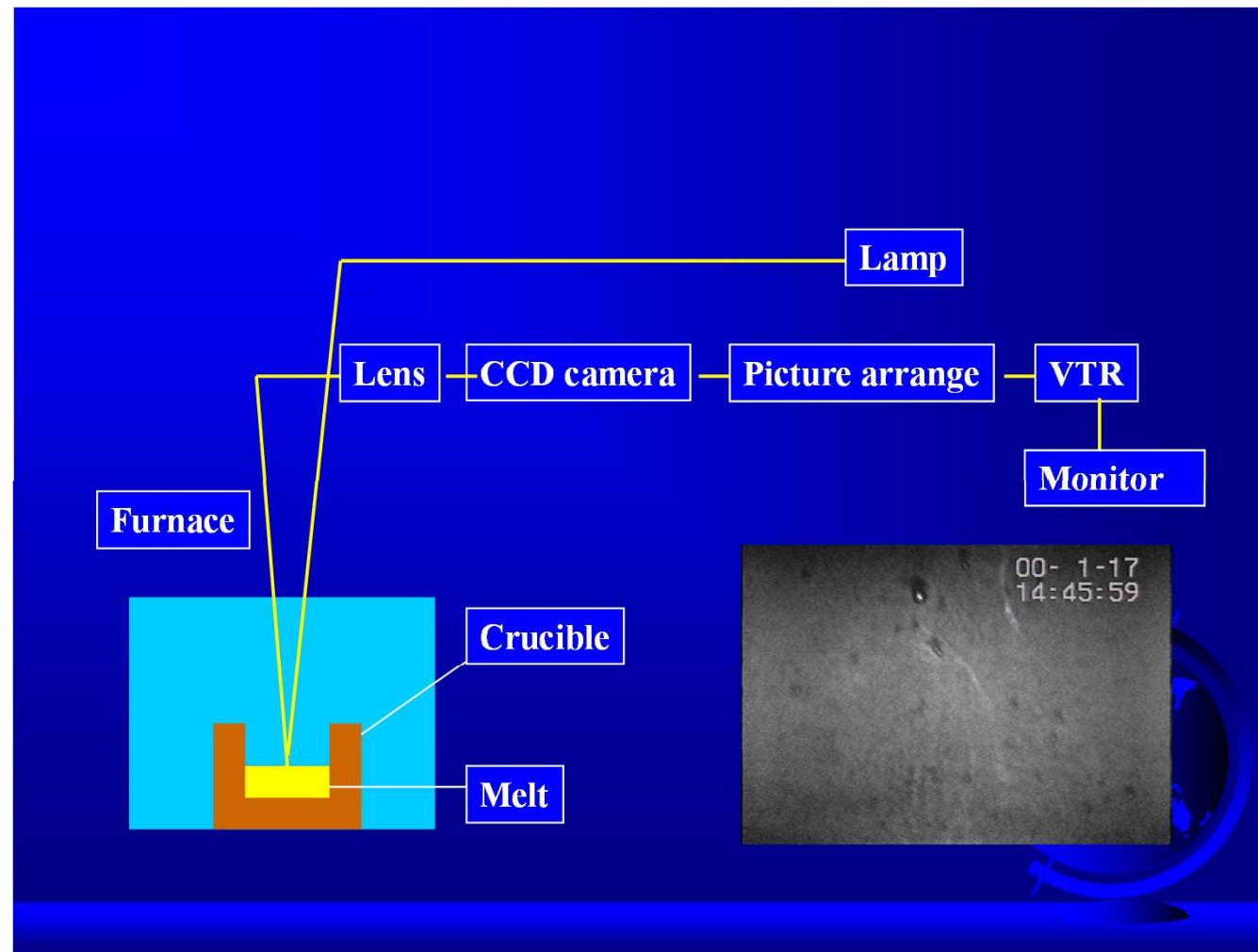
Feature

- Longer time test than disc method

Challenge

- No glass change → Testing time: e.g. 120hrs
- Longer processing time: Making, Slicing, Polishing crucibles

3) Continuous blister test



Blister rate = Number of blister/cm²/hrs

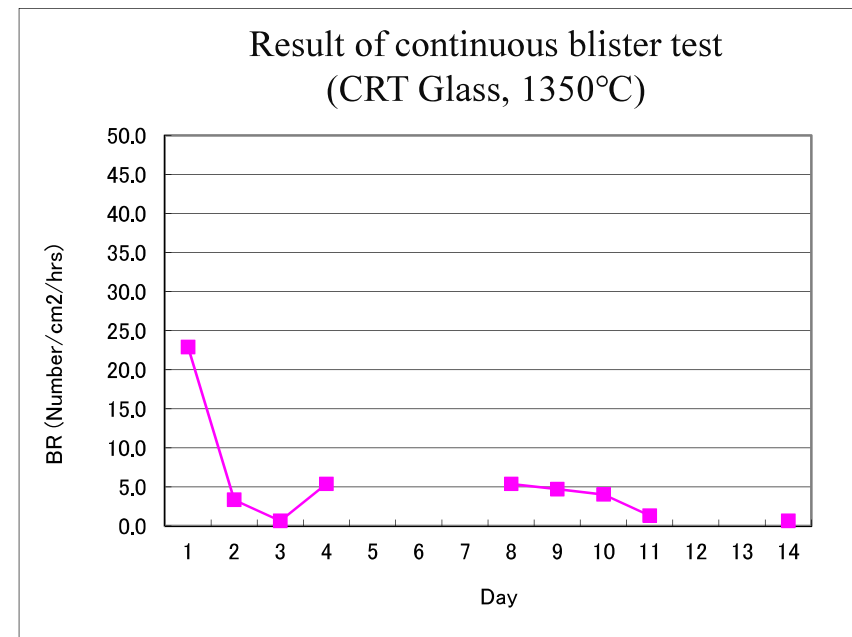
3) Continuous blister test

Feature

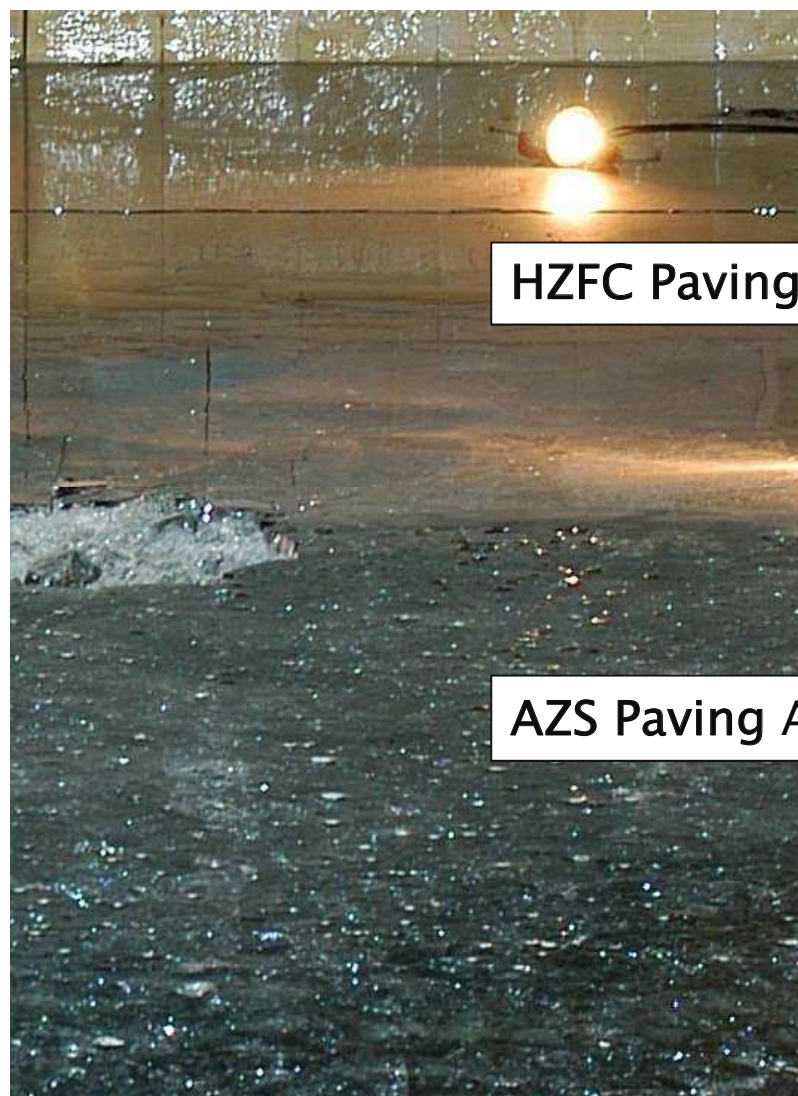
- Direct observation by CCD camera
- Long term test (e.g. 2-3 months or more)
- Glass change (Feed new glass cullet daily)
≡ similar condition as actual furnace.
- Temperature cycle

Challenge

- Cost, testing time

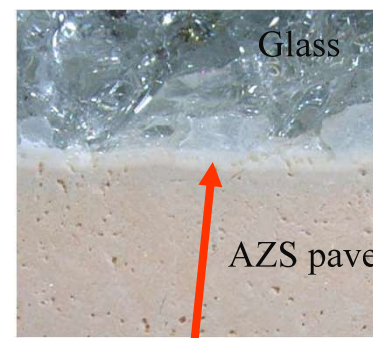
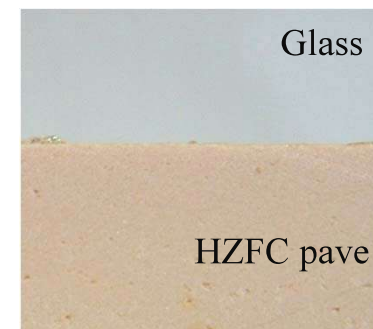
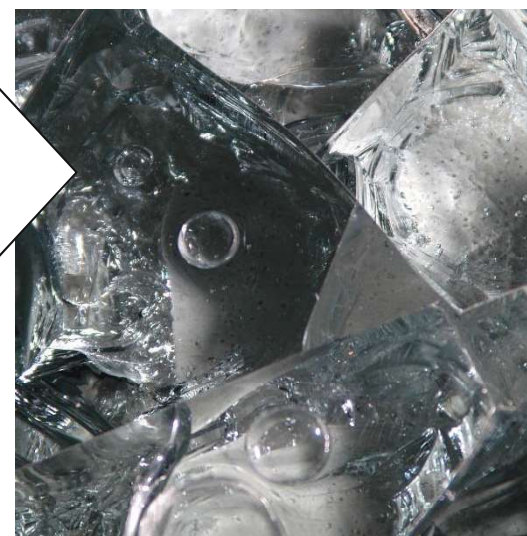
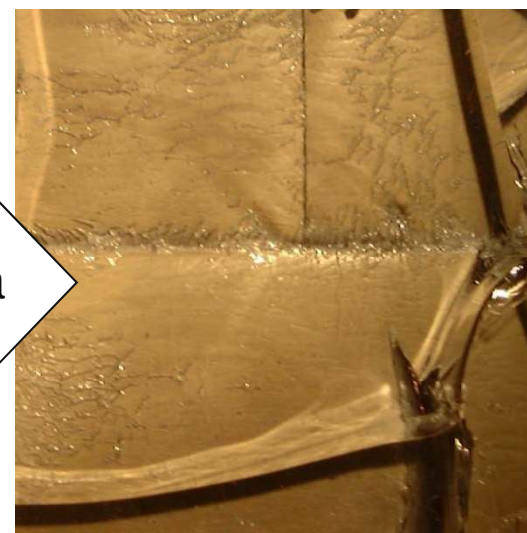


4) Blistering Behavior in Actual Furnace HZFC vs AZS



HZFC Paving Area

AZS Paving Area



Reaction layer
Blister, Stone

End of File