



CERAMIC TILE INSTITUTE OF AMERICA, INC.
12061 Jefferson Blvd., Culver City, CA 90230-6219

CTI FIELD REPORT 64-1-1 (R-96)

SUBJECT: LABORATORY TESTING ON THE EFFECTS OF OPENTIME AND COMBING ON BOND STRENGTH

I. INDEPENDENT TESTING ON OPENTIME AND COMBING

- A. At our request, controlled tests were conducted at Smith- Emery Company.
- B. **Purpose of the tests:** To find how much various intervals of "open time" (between the time that bonding mortar was combed on and the time that the tile was applied) affected the bonding strength or success of the job.
- C. **Phase I**
Tile was first placed on the original bonding mortar 10 minutes after it had been combed. Tile was again placed on the same bonding mortar at other intervals. Final placement on the original bonding mortar was made 45 minutes after combing.
- D. **Phase II**
Original bonding mortar was recombined and additional tiles were then placed 5-minutes after recombine and at various intervals for a 25-minute period.

II. CONCLUSIONS

- A. Immediate placement of tiles on the fresh combed bonding mortar provides the best bond. (Recomb if mortar has been setting more than 15-minutes).
- B. Additional beating or wetting of the tiles will not provide a bond on bonding mortar that has set too long after combing.
- C. Tile placed on recombined bonding mortar will provide a bond, but not as good as on freshly combed bonding mortar.
- D. It may help to spread bonding mortar ahead in thick gobs and then comb immediately before placing tile.

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SMITH-EMERY COMPANY

CHEMISTS • TESTING • INSPECTION • ENGINEERS

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<u>CONDITION OF TILE LAYED</u>	<u>OPEN TIME OF THIN SET MORTAR, MINUTES</u>	<u>NO. OF TAPS</u>	<u>BONDED AREA, SQ. IN.</u>	<u>LOAD, POUNDS</u>	<u>PSI</u>
DRY	10	8	18.06	600	33.2
DRY	15	8	18.06	545	30.2
DRY	20	8	18.06	195	10.8
DRY	30	8	18.06	90	5.0
DRY	35	8	18.06	FAILED	---
WET	35	8	18.06	80	4.4
DRY	40	10	18.06	75	4.2
WET	40	10	18.06	70	3.9
WET	45	10	18.06	FAILED	---
		MORTAR	RECOMBED		
DRY	50	8	18.06	400	22.2
DRY	60	8	18.06	315	17.4
WET	70	8	18.06	315	17.4
DRY	70	8	18.06	260	14.4
WET	75	10	18.06	200	11.1
DRY	75	10	18.06	45	2.5

RESPECTFULLY SUBMITTED,
SMITH - EMERY COMPANY

BY 
GEORGE BATTEY
CIVIL ENGINEER