



CERMALAB CC  
Materials Testing Laboratory

## Cermalab CC

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<b>To:</b>	Crispin Pemberton-Pigott	<b>From:</b>	Bruce Berger
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<b>Fax:</b>	011 339-6634	<b>Pages including cover:</b>	2
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**Urgent**



**For Review**



**Please Reply**



**Please Comment**

13 March 2008

Dear Crispin,

Herewith the chemical analysis and thermal expansion results for the Baldosa Tile sample you provided. This work was carried out against your order number Crispin and has been allocated Cermalab project number C07-279.

This tile was originally believed to be a green body, and chemical analysis (XRF), mineralogical analysis (XRD) and thermal expansion was requested for this work. This work was reduced to only XRF and thermal expansion when it was seen to be a fired body. The thermal expansion was measured on a crushed sample that was reconsolidated with 2% bentonite as a binder. The chemical analysis is presented in Table 1, and thermal expansion is presented in Figure 1.

This work shows that the Baldosa body has higher  $\text{SiO}_2 / \text{Al}_2\text{O}_3$  ratio than kaolinite,  $(\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O})$ , and that there is no free silica present within this body (no characteristic alpha to beta quartz transition is seen in thermal expansion plot).

It is believed that the raw material used here is either pyrophyllite or montmorillonite, which has a higher  $\text{SiO}_2 / \text{Al}_2\text{O}_3$  ratio. This can be confirmed by XRD on the green body – if possible please could you obtain a sample of the green body.

The good thermal shock resistance of this body is believed to be from a low firing ( $500^\circ\text{C}$  to  $600^\circ\text{C}$ ) and hence a high porosity, and also that there is no free silica presence. The thermal expansion plot shows that the coefficient of this material is  $5.3 \times 10^{-6}$ , which is ~6 times that for PKCN3 below  $500^\circ\text{C}$ .

Please contact me if you have any questions.

Regards

Bruce Berger.

Members: Berger, M.B.; Du Toit, P.J.; Mothiba, A.M.

Table 1: Chemical analyses (by XRF)

OXIDE	%
SiO2	59.3
Al2O3	17.3
Fe2O3	7.0
TiO2	0.99
P2O5	0.06
CaO	2.9
MgO	0.93
Na2O	1.84
K2O	2.3
LOI	3.4
TOTAL	96.0

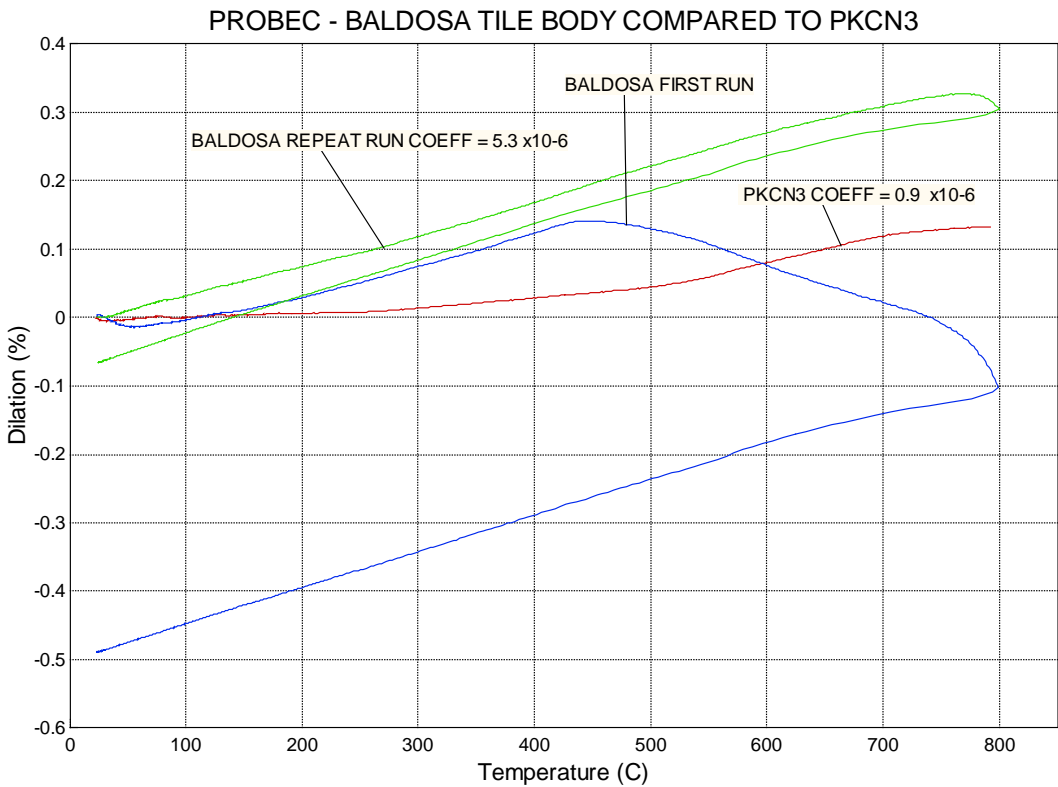


Figure 1: Thermal Expansion of Baldosa Tile Body