



**Institute of Nanoscience and Nanotechnology
Advanced Ceramics and Composites Laboratory**

Head: Dr George Vekinis

Tel: +30 210 6503322, Fax: +30 210 6503377

gvekinis@ims.demokritos.gr

<http://web.ims.demokritos.gr/Advanced-Ceramics/>

NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"

153 10 AG. PARASKEVI ATTIKIS, ATHENS, GREECE POB 60228 TEL. 6503000, FAX 6532649 e-mail: efthi@gei.demokritos.gr

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MONOSI-SYSKEVASIA SA
70km Nat. Road Athens-Lamia
Avlida Chalkidas, Evia
34100
Greece
monosi@otenet.gr

INTERNAL HEATING CURVES IN AN EXPANDED POLYSTYRENE CONTAINER No5

Introduction:

On 25 February 2016, 4 expanded polystyrene containers No5, of external dimensions 370mm x 255mm x 160mm, wall thickness 16.5mm containing 4 x 500g packs ice-packs marked "Plastica" were received from MONOSI-SYSKEVASIA SA for thermal insulation tests over 48 hours.

Method:

The thermal insulation tests were carried out in an environment controlled chamber of internal dimensions about 400 x 350 x 300mm under constant temperature conditions without air circulation.

One expanded polystyrene container was loaded with 2 bottles (500g each) of water at a temperature of $3 \pm 1^\circ\text{C}$ and 4 "Plastica" ice packs (2kg in total, gel) at $-15 \pm 1^\circ\text{C}$ arranged as shown in Figure 1. The container was closed with its cover and placed inside the closed chamber (Figure 2). The temperature of the water in the bottles (T_{water}) and that of the environment inside the chamber, above the container (T_{env}) was monitored using type K thermocouples and the T vs time curves were recorded in a computer over more than 48 hours. Two tests were carried out, at $T_{\text{env}} = 22 \pm 1^\circ\text{C}$ and at $T_{\text{env}} = 27 \pm 1^\circ\text{C}$.



Figure 1. The packing arrangement in the expanded polystyrene container. T_{water} was monitored by placing a type K thermocouple directly inside the water, through a small hole in one of the bottles.

MONOSI-SYSKEVASIA SA – THERMAL INSULATION TESTS OF EXPANDED PS CONTAINER No5

The monitoring system is shown in Figure 2 below.

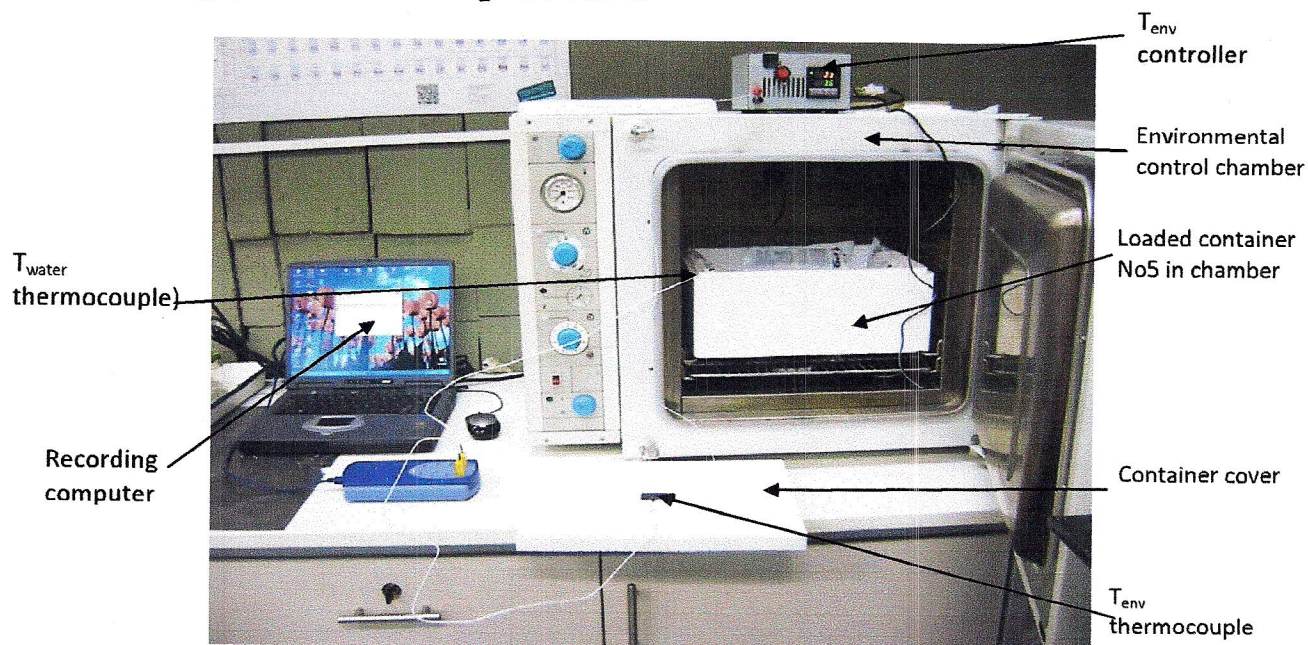


Figure 2. The recording system with the container inside the chamber, before start of test.

RESULTS: The results of the two tests carried out are shown in Figure 3.

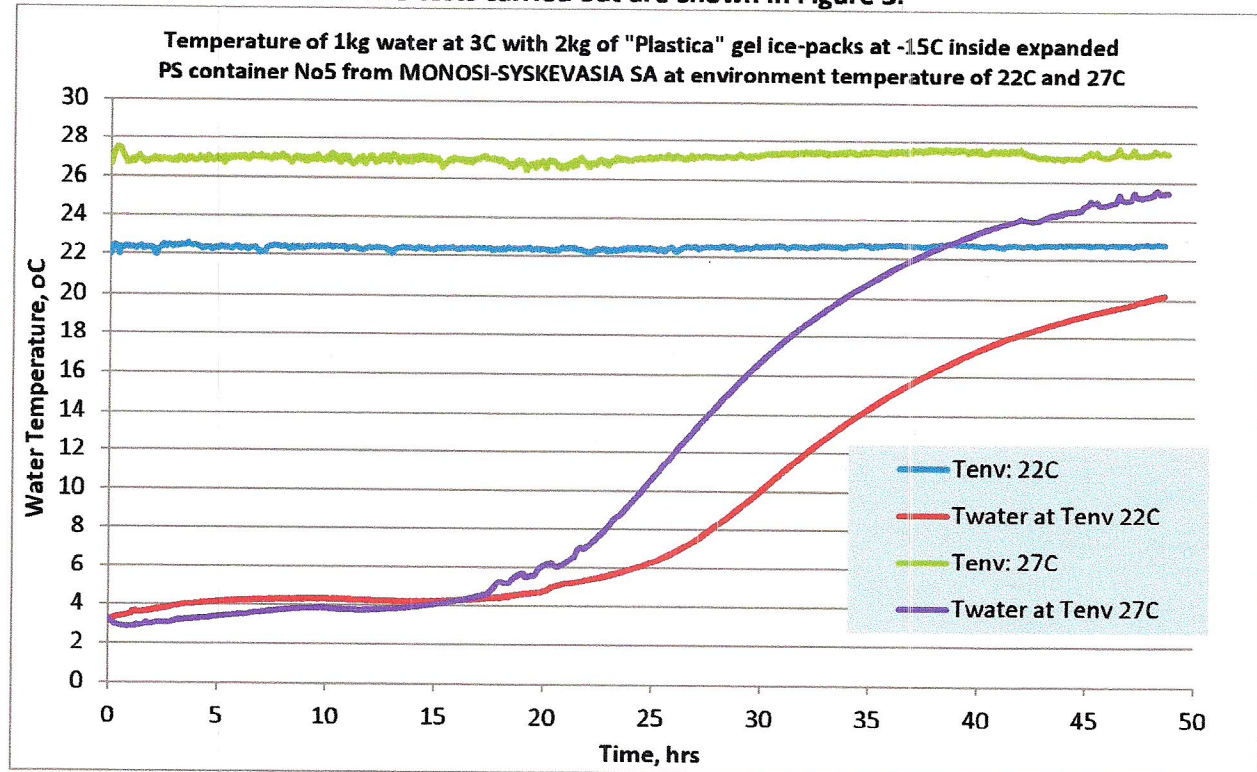


Figure 3. The T vs time curves for the two tests.

END OF REPORT

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 ΕΡΓ. ΠΡΟΗΓΜ, ΚΕΡΑΜΙΚΩΝ και Σύνθετων Υλικών
 Δρ Γεώργιος Βεκίνης
 Διευθυντής Ερευνών – Υπεύθυνος
 Εργαστηρίου Προηγμένων Κεραμικών