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ECONOMICK SHUTTLE KILN LIFE PROJECT

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Abstract: ECONOMICK LIFE project developed an innovative shuttle kiln for ceramic production, which consumes about 47% less energy than actually existing ones and, consequently, allows the industry to reduce costs, CO₂, NO_x, HF, SO_x and dust emissions, and raw materials. Intermittent (or shuttle) kilns are used in about 50% of the ceramic sectors, excluding only tiles industry. Producers of sanitary and table ware, refractory or artistic ceramics use a shuttle kiln for refining ceramic artefacts with some defects, while smaller factories use such a kiln also for first firing, alternatively to a tunnel kiln that requires high production levels. A patented technology is used to recover heat from flue gases to pre-heat combustion air. Significantly, this technology does not use flues or additional pipes and above all does not alter the fluid dynamics of the flue gases in any way, which therefore remain identical to those of a traditional shuttle kiln. This advantage, together with the possibility of adjusting the flame speed, is vitally important as it optimises the flue gas/ piece thermal exchange and does not affect either uniformity of firing or energy savings at low temperatures. This patented technology allows to use preheated combustion air and to reduce max temperature in the burner body, adjusting flame speed. Furthermore, SE.TE.C. software allows to maintain a preselected air/gas ratio and to use different values in function of the firing cycle. The study, based on a dedicated software package, allowed for a careful selection of the refractory materials, resulting in a lining that minimises thermal inertia and at the same time has a cool wall temperature of below 50°C. Thanks to a computerized management of air and gas flow, the almost complete reuse of warm air from cooling and advanced materials for thermal insulation, the ECONOMICK kiln ensures a specific consumption of 1300-1400 kcal/kg of firing product, comparable to the performance of a good tunnel kiln. By substituting their tunnel kilns with ECONOMICK kiln, European industries - in particular SMEs – will drastically reduce their costs. This will strongly boost their capacity to maintain or improve their market share, especially in the high-end market.

Key words: kiln, sanitaryware, tableware, heat recovery, thermal insulation, LIFE project.