



## Energy savings go through the roof at tile manufacturer

Sandtoft Tiles of Hull have achieved up to 60% energy savings by the adoption of variable speed control on their kiln drives, achieving tighter process control while dramatically reducing the environmental noise impact of the fans themselves.

By the application of variable speed drives to the combustion and cooling control of their two new kilns, Sandtoft Roof Tiles, Britain's leading independent roof tile manufacturer, have not only realised energy savings of up to 60% but also dramatically reduced fan noise while at the same time, achieved tighter process control.

Sandtoft Roof Tile's Broomfleet Tileries, Nr Brough, East Yorkshire, manufacture clay roof tiles, a process which demands kiln firing of the dry clay tiles of up to 60 hours at over 1000 deg C, followed by a lengthy cooling period of up to 28 hours, depending on the type and number of tiles being fired. Combustion conditions are critical to product quality, and the kiln temperature is increased through a predetermined cycle with the temperature even throughout the kiln. This necessitates a combustion fan to supply the correct amount of air for efficient burning of the natural or LPG gas fuel. In addition, an eductor fan ensures even heat distribution through control of the flue gas extraction via kiln pressure control. Uneven firing or cooling can result in discolouration and distortion of the tiles and a high rejection rate, so close control of temperature gradients throughout the kiln is critical.

On their older kilns, Sandtoft control the combustion and cooling cycle air demand by opening and closing dampers. Frequently this means running the fan motors at full speed with the dampers virtually closed. Not only is this very inefficient but it means that fan noise is significant with

the motor constantly at full speed. So successful has been the application of VSDs that Sandtoft are to refurbish the existing kilns applying the same control system and Danfoss VLT 6000 drives.



When deciding on the specification of the new intermittent kilns, Steve Porter, the Works Electrical Engineer, for a number of reasons decided on Danfoss VLT 6000 drives for both the 37kW combustion fan and the 18.5kW eductor fans using the flexibility of the VLT 6000's multi set-up function. Steve comments; 'Fitting VLT 6000 drives to the combustion fan means we can not only utilise it during the firing cycle to provide air for the combustion conditions but now we can use the same fan on a different set of settings to provide PID loop controlled cooling air during the cooling cycle. We have the combustion and cooling cycles pre-programmed into our PLC; the set-up of the drives switches seamlessly between a constant reference for firing and a PID loop control for cooling. Not only does this give us excellent control over the firing and cooling conditions in the kiln but now the fan is now drawing closer to 10kW than its 37kw rating when firing and only using the full 37kw capacity for rapid cooling as required. Similarly, the eductor fan, controlled via a pressure sensor within the kiln uses two set-ups; one to control kiln pressure and the other to boost rapid cooling air.



Steve added 'The energy savings are very welcome in view of the increased costs imposed by the Climate Change Levy. Energy savings of 60% are being realised over a like for like firing cycle. Reduced noise levels also are important to Sandtoft's environmental policy and have been reduced so dramatically on long cooling cycles that it has proved necessary on occasion to check visually on fan operation as they are now virtually inaudible.'



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