

Little things mean a lot

Small energy savings in heating and cooling systems delivered by often overlooked components can deliver large cumulative benefits. **Andy Lucas** explains.

Local authorities which are building schools under the Government's 'Building schools for the future' (BSF) programme are incorporating sophisticated building-management systems (BMSs) and other new technologies into their projects to achieve savings in energy use and CO₂ emissions.

These systems can deliver impressive efficiency benefits. Some new school developments, however, are improving even on these results by adopting a design approach that includes attention to detail in specifying individual system components.

Designers on these projects are demanding that components such as HVAC balancing valves should be lighter in weight, more compact in order to save on space and to have a higher degree of accuracy to minimise energy usage.

One school currently under construction adopting such a detailed design approach is Bideford College, which Devon County Council is showcasing as a national demonstrator in BSF. Phase one of the new college is due to be complete in July 2010.

The ambition is to make the school exceed the requirements for the award of a nationally recognised accreditation for reduced heating, energy and water consumption set out in the Government's guidelines entitled 'sustainable schools — for pupils, communities and the environment'.

Devon County Council is trying to make the new £44 million college as close as possible to being a carbon neutral site using cutting-edge environmental and ecological systems to reduce CO₂ emissions.

The college will have bio-mass boilers burning wood chips (with gas boilers installed as a backup), solar heating and a rain-water recycling system for flushing WCs.

The naturally ventilated building will be managed in zones. All the systems will be controlled by a sophisticated BMS which will monitor heat gains and cooling and operate additional mechanical heating and cooling systems as required.

Devon County Council developed the building-management system with NPS South West property consultants. The system was specified by NPS and is being installed by M&E engineers MITIE.

The regulating and commissioning valves, check valves, ball valves and strainers for the HVAC system have been supplied by Crane Fluid Systems via its distributor in the South West, BSS.

The heating and cooling elements of the HVAC system work at maximum efficiency when operating as close as possible to their design parameters — which requires the valves controlling the fluid flow to deliver precisely the right amount of hot or cold water.

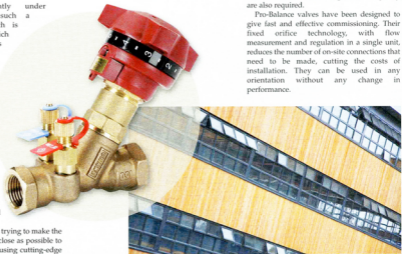
Static valves from Crane's Pro-Balance range have therefore been specified at Bideford College to control the flow of water around the heating and cooling systems. They will be used to balance the systems and measure flow with an accuracy of ± 5 per cent. Performing to standards identified by CIBSE

pumps driving water circulation are also significant consumers of energy — even variable-speed pumps controlled by a BMS which match power consumption to the flow required.

Further small but significant energy savings can be delivered by specifying low-loss regulating valves and ball valves (used to isolate sections of the system for maintenance and other purposes) with the bore diameter the same as the internal pipe diameter. Minimising the pressure drop across these valves minimises pumping losses. Correctly specified, these components can make a significant cumulative contribution to energy efficiency.

The HVAC components need to be more than just efficient, of course. Easy installation and maintenance and a high level of quality are also required.

Pro-Balance valves have been designed to give fast and effective commissioning. Their fixed orifice technology, with flow measurement and regulation in a single unit, reduces the number of on-site connections that need to be made, cutting the costs of installation. They can be used in any orientation without any change in performance.



One of the key elements in maximising the efficiency of the biomass-fuelled heating system in the new Bideford College is accurate balancing using valves from Crane's Pro-Balance range.

and BSRIA, the use of these valves will enable the systems to manage flows at maximum efficiency.

Keith Dixon, senior mechanical engineer with NPS, said: 'Commissioning valves from Crane Fluid Systems allow us to accurately regulate and balance flow rates in the system. They help the system to perform consistently to optimise performance and thereby create significant energy savings.'

The biggest energy load in an HVAC system is the heating and cooling itself. However, the

Carefully specifying the right HVAC hardware at the design stage and then working with contractors to ensure that the specifications are translated into installations, not amended in pursuit of short-term cost savings, can deliver real additional benefits when striving to achieve sustainability in new school buildings.

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