

## Injection moulders keep cool under pressure

**A newly developed testing unit is helping injection moulders and mould toolmakers alike to ensure consistent quality in their end-products. Based on a relatively simple pressurised water technique, the key to its success is an automated control panel based on Mitsubishi Electric components.**

The portable single phase testing unit has been developed and refined by Mike Atkin of Atkin Machine Tool Maintenance in Oldham, Manchester, along with control systems' expert, George Newton of Newton Tesla (Electric Drives) Ltd, in nearby Warrington.

"We produced a prototype back in 2007," explains Mike "and have progressively improved it through a number of iterations. We now have a growing number of high profile users, who are helping us further develop the concept."

In use, the tester quickly fills the cooling water circuits of plastic injection mould tools and pressurises them to up to an adjustable pressure of up to 12 bar. If the pressure holds steady for a set period of time, the integrity of the circuits is proven. However, if the pressure decays, this indicates that there is a leak.

A second function will then compare flow rates at different points in the circuits, with discrepancies indicating blockages. The unit can also air purge the water circuit after testing.

To achieve a high level of accurate performance, cycle after cycle, a high specification multi-stage stainless steel pump is fitted with a D720S series 1.5kW Mitsubishi inverter, a Mitsubishi Alpha II (Programmable Logic Controller) and flow and pressure sensors in a closed loop configuration. In use, an adjustable water pressure of up to 12 bar is maintained throughout the flow stages of the test cycle by means of the inverters inbuilt pressure control algorithm.

"This worked well on the original designs," explains George, "but Mike quickly realised that users would like the comfort of a display so that they knew what was happening, so rather than just having basic pressure/flow indication we upgraded to a Mitsubishi GOT 1020 HMI touch screen which we programmed to provide results derived from analysis as well as the raw data."

All of the automation equipment is from the more compact end of the Mitsubishi range. Each part is made to an optimised design that ensures that the most popular features are included. This means that high-performance systems can be built and that they have the capacity to be easily adapted and reconfigured to suit the evolving needs of individual applications.

The testing unit has several other features that are proving popular with users in the field. For instance, the water used for the pressure tests is held in a closed circuit that includes a filter so it can be cleaned and reused. This is particularly useful in hard water areas and where contamination build-up is inherent.

Water valves, manifold, flow meter and air purge valve are also included to enhance controllability. These are all monitored by the PLC, for precise control.

Built robustly to suit workshop environments and using ergonomic design principles to enhance usability, the testing unit is proving popular with a wide range of users. Mould toolmakers have realised that they can speed up simultaneously and improve testing, while fully logging all test data for traceability records. Injection moulders generally start to use it as an offline diagnostic tool in their repair and maintenance departments but many then choose to integrate it into their production operations so that moulds can be benchmarked and checked regularly between moulding operations.

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