

## Science City Research Alliance – Energy Efficiency Project equipment/facilities

### Thermal and Solar Technologies, School of Engineering, University of Warwick (Custodian: Professor Bob Critoph)

Equipment item	Equipment facility/group	Description	Location	Contact	Booking System	Status
High Pressure Differential Scanning Calorimeter	Material characterisation.	Calorimeter with optional crucibles for controlled high pressure. Measures heat flow and temperature change of a sample material through a programmed temperature profile. Pressures up to 100 bar, temperatures -40°C to 600°C	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Hot Disk Thermal conductivity instrument	Material characterisation.	Measurement of thermal conductivity of solids at ambient temperature by a transient method.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Coriolis Mass Flow Meters	Ancillary	Meters for the measurement of fluid flows. Temperatures up to 200°C Pressures up to 200 bar.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
3 x Instrumentation and control racks	Ancillary	Three instrumentation and control racks for data acquisition and control of laboratory experiments with a PC. Equipment monitors pressures, temperatures and flow rates in experimental equipment. Controls equipment and heated or chilled fluid flow sources.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
High Power Programmable heat source/sink	Ancillary	Heating or cooling of a circulating fluid. Power 32kW at -20°C to 200°C	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Medium Power Programmable heat sources/sink	Ancillary	Heating or cooling of a circulating fluid. Power 6.5kW at -20°C to 200°C	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
2 x Low Power Programmable heat sources/sink	Ancillary	Heating or cooling of a circulating fluid. Power 0.4kW at -20°C to 200°C	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available

Magnetic suspension balance	Material characterisation.	This balance weighs a solid material exposed to gas at a range of pressures and temperatures with a resolution of 10µg with controlled temperatures from -20°C to 150°C and pressures up to 100 bar. This instrument is principally aimed at measuring the adsorption of refrigerants on adsorbents	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Magnetic suspension balance with gas dosing equipment	Material characterisation.	This balance weighs a solid material exposed to a binary mixture of gases at a range of pressures and temperatures with a resolution of 10µg. Controlled temperatures from -20°C to 150°C and pressures up to 100 bar. The mixture is controlled by a gas dosing unit.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Environmental Chamber	Thermal equipment testing.	Two chambers, 3mx3m floor area with independently controlled temperature and humidity. (-20°C to 60°C, 0 to 100% RH). The wall between the chambers is removable. This facility is designed for the testing of air conditioning machines but may be used for the measurement of conduction in structures or other applications.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available autumn 2010
Steady State Thermal Conductivity Instrument	Material characterisation.	This instrument can measure the thermal conductivity of materials that exhibit phase changes or that are strongly anisotropic with high accuracy (3%). Sample size 50.8mm dia, up to 30mm thick , conductivities 0.1 to 20 W/mK	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Rheometry and Viscometry Measurements	Material characterisation.	These instruments can accurately determine fluid viscosity over a range of temperatures from below 0°C to above 150°C. In addition to standard measurements using cone & plate, coaxial cylinder and vane tool measuring systems the system is suitable for measuring the effects of a modified surface finish.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Solar Simulator (Large)	Solar collector testing and evaluation	A 3.2m2 continuous solar simulator allows evaluation of the performance and detailed characterization of solar thermal and photovoltaic systems. The angle of inclination of the solar simulator and test panel can be varied from the vertical to horizontal to reproduce convective effects within the panel.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available autumn 2010
Optical Characterization	Material	These instruments enable optical transmittance of coated glasses. This equipment can measure the transmittance of materials within	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available

Equipment	characterisation.	the wavelength range of at least 350nm to 2200nm. In addition to small single component samples the equipment is able to measure total transmission through multiple layered glazing systems or systems that introduce significant levels of light scatter during transmission.				
Weather station and Tracking Pyrheliometer Infrared Radiometer and Spectro Radiometer		An outdoor test facility for solar thermal, photovoltaic and building façade components is available. The weather station provides general weather data which in addition to solar radiation intensity and ambient temperature provides wind speed and direction, rainfall and humidity.  The radiometers provide accurate determination of the time varying radiation from sunlight which are essential for the correct analysis of experimental measurements.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
UVP Duo		Measurement of fluid velocities and the spatial variation of those velocities. The container materials may be metals, plastics or glass. The measurement system is non-intrusive and provides good resolution over a wide flow velocity range with high accuracy and repeatability.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
Emissometer		Measurement of the emissivity in the infra red region of surfaces	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available
IR Camera and Additional Lens		This high specification IR camera is suitable for both characterization of large scale building façades and small scale. Applications include visualisation of thermal phenomena, assessment of insulation performance and the detection of hotspots and/or faults in systems.	School of Engineering, University of Warwick	Roger Thorpe E: <a href="mailto:r.thorpe@warwick.ac.uk">r.thorpe@warwick.ac.uk</a> T: +44 (0) 24 76528017	Online (in progress)	Available