Technical Bulletin No: 24-2016

Title:	**Workshop Test Equipment Management – Inspection Maintenance Calibration**
Priority	Green – Opportunity to Improve
Legislation:	PUWER, HASWA S2 S3, E@WR
Brief Description:	Following a number of member enquiries, this bulletin covers guidance on industry best practice regarding the inspection, maintenance and calibration of workshop test equipment
Equipment Affected:	Electrical test equipment (PAT), multimeters, socket testers, generator test stations / load banks, tachometers, thermometers, gauges, load cells, levels and torque wrenches

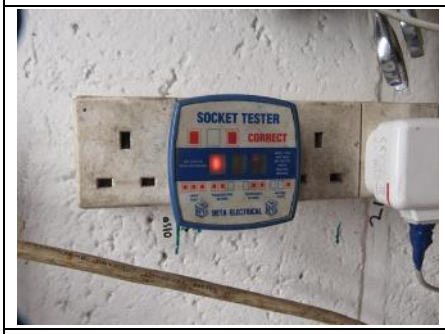
A wide range of equipment is used for fault diagnosis and to test safety critical components and systems on machinery. Some items of equipment are to purely assist with fault diagnosis and others are to ensure the equipment will perform safely.

Management of this equipment condition varies including: annual replacement, in-house calibration or outsourced calibration.

Annual calibration alone does not ensure test equipment will perform, all items require some form of maintenance or care. Comparative tests and pre-use checks may prove to be a more effective management system for some items of test equipment rather than relying on some form of annual check.

Many common issues identified are for equipment that has not been maintained between specific tests / calibration. e.g. a torque wrench left 'wound on' in between uses will fall out of calibration limits in less than a year. The following images cover some common maintenance issues with workshop test equipment.

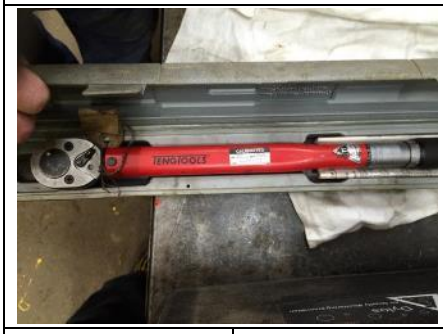
1 – Socket Tester – lamp failed – not designed to be left plugged in



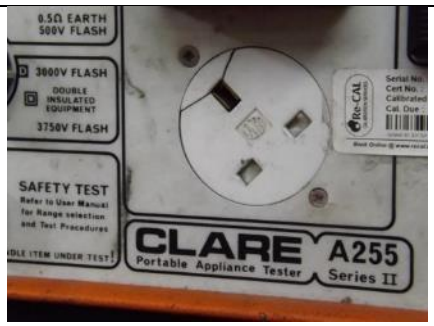
2- Old Durite type battery drop tester in poor condition

3 – Generator test station gauge glass broken, prone to damage

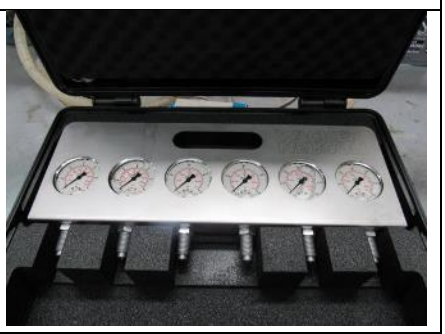
4 – Torque wrench left wound-on and out of calibration by 7 months



5 – Socket damaged on Clare A255 – repair required



6 – New test gauge kit – no calibration information available



Recommended Actions:	• Review tables overleaf and your existing management system for test equipment • Consider adding fleet numbers to test equipment to enable inspections to be be recorded via your hire system. • Ensure users are briefed regarding care and maintenance of test equipnent
Circulation:	Management team / Workshops

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Item Name(s)	Image	Description	Uses in Hire	Maintenance / Care Required	Test / Calibration Method	Suggested Frequency
Multimeter / Avometer		A multi-function electrical test meter	For diagnosis of faults most commonly used to confirm voltage and continuity. To aid technicians with diagnosis, not used for signing off equipment or as part of a Combined Inspection and Test	Battery replacement as required. Storage care (dry / protected from damage) and checking lead integrity / condition before use e.g. by carrying out continuity test of leads before each use by touching test tips together	Comparative test i.e. comparing test results between one unit and another on a circuit, battery or similar. Could be completed in-house	Period not exceeding 12 months
Generator Test Station		Test station typically with six gauges (3 for 110v, 3 for 230v) that indicate voltage, frequency and current	To enable setting of engine RPM and confirm that generator / engine performance is maintained to match generator specification e.g. is voltage / frequency maintained at peak current draw / load	Inspection before use including: Check that gauges are zeroed. Cable and plug condition and stored to reduce chance of gauge damage.	Comparative testing when compared to a calibrated unit. Test results recorded e.g. on manual paperwork or hire system. External calibration may be used.	Period not exceeding 12 months
Portable Appliance Tester / Clare Tester / Megger Tester		A combination test station able to carry out a range of tests as part of a Combined Inspection and test	To enable technicians to complete the test element of a combined inspection and test (PAT) procedure.	Inspection before use, use of fault simulation e.g. Y250 on Clare equipment. Minimum of weekly recorded fault simulation.	Calibration by suitable competent person to manufacturers standard. Can be completed at branch or by sending item away. Spare machine may be required.	Period not exceeding 12 months.

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Torque Wrench / Torque adaptor		A device for measuring turning force applied to fasteners. Available in various sizes and types.	For a range of uses including critical fasteners e.g. wheel nuts and engine fasteners (head bolts etc) through to checking rolling torques and brake performance e.g. rail-link trolley brakes.	Maintenance as specified by the manufacturer. Wound-off after use, avoiding overload and use of appropriate accessories.	Testing against its useable range using a suitable calibrated torque test tool. These are available from various tool suppliers including Snap-On, Facom and Britool. Can be completed in-house.	Period not exceeding 12 months. For frequently used equipment, review frequency, consider a comparative check
Hydraulic gauges / test equipment		Gauges include digital transducers and mechanical gauges and test kits. Flow testers may also be used.	For diagnostic and performance tests on a wide range of hydraulic and hydrostatic equipment from handheld breakers through to mobile plant, powered access and cranes / lifting equipment.	Inspection before use including: Check that gauges are zeroed. Connecting hoses and connector condition is safety critical. Gauge glass / lens condition should also be checked.	Comparative testing when compared to a calibrated unit. Test results recorded e.g. on manual paperwork or hire system. External calibration may be used.	Period not exceeding 12 months.
Socket Testers		Available in a range of types for testing socket outputs for 230 and 110v and 13 to 32 amp.	Used for basic testing of electrical equipment including extension leads, transformers, fly leads and splitter boxes.	Pre-use visual check regarding body condition, cable etc. Not designed to be left powered up e.g. in a live socket.	Comparative test only. No adjustment / calibration possible. Compare units to a similar type to confirm correct operation.	Period not exceeding 12 months.

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Tachometer		A device for measuring engine / shaft speed using photo or contact input.	Confirming shaft / spindle speeds on engines and other machinery. Used for fault diagnosis, engine / machine set-up and adjustment.	Maintenance as specified by the manufacturer. Replacement of contact tips once worn.	Comparative testing against a machine with a known spindle speed e.g. electrical item with speed regulation. If both tachometers read within a small range (5%) then the equipment is sound.	Period not exceeding 12 months.
Battery Drop Tester		For performance measurement of lead-acid batteries	For testing lead acid batteries fitted to hire fleet equipment e.g. mobile plant, powered access and traffic lights etc.	Pre-use checks including clip / cable condition and gauge condition e.g. lens intact. For diagnostic tests only.	In-use test e.g. on a good battery with confirmation of performance.	Period not exceeding 12 months.
Manometer / Dust Extractor Test Kit		For measurement of air pressure / vacuum	Used as part of the HAE TExT dust extractor test kit	Pre-use checks / battery replacement as required. Item completes a self test on power up. Can be zeroed on start up / in-use if required.	Comparative test, item has no adjustment possible and either fails or works. Annual test in comparison to another item will be sufficient	Period not exceeding 12 months.

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