ELECTRICAL

"Surveyors are not Electricians - But …"!

Comments on services and condition-scoring are required within the scope of RICS' HomeBuyer Report, but how far should a surveyor be expected to go when reporting on electrical wiring?

Richard Hulls explains:

Initial visual inspection

Professional examination and testing of electrical systems require an initial visual inspection to determine the extent of testing to be carried out; an assessment of the system's age, and any blatant non-conformity caused, for example, by DIY work. The visual checks will also identify any sensitive parts which might be irreversibly damaged if subjected to the high voltage used when testing the circuits for insulation-resistance.

Visual inspection will also identify whether the supply is single (230v) or three-phase (440v); the arrangement for earthing and what provisions are in place for circuit protection. The next stage is intrusive and involves opening-up fittings followed by dismantling circuits at the distribution board and use of test equipment. Surveyors are not expected to open-up or test circuits.

Domestic wiring : Frequency of testing

Unless trained to carry out inspection and testing of electrical systems, surveyors should generally avoid a detailed commentary in a building report. Yet, somewhat conveniently for a surveyor, the *Institute of Electrical Engineers* (IEE) gives its recommendation that all domestic wiring systems should be inspected and tested at intervals no less frequently than 10 years or on change of occupancy, whichever occurs soonest.

'Competent Person'

For this reason, it is appropriate to recite the IEE recommendation in a report and recommend that testing should be carried out by a competent person registered with one of the recognised certification bodies (BSI, NICEIC etc).

Periodic Inspection Report (PIR)

Unless the building is to be re-wired the recommendation should be given for a '*Periodic Inspection Report*' (PIR) with the meaning defined in BS 7671 – essentially the '*17th Edition of the Wiring Regulations*' and, to be complete, the documents supplied must include not only the certificate but the '*Schedule of Tests*' carried out and a '*Schedule of Test Results*'. The Periodic Inspection Report will provide a concise overview and indicate whether ungrading is required, as well as detailing principal faults, if any, for attention. The PIR is essential for a client, particularly where there is uncertainty about the previous date of testing, the availability of installation certificates, or concern that the system may have been the subject of a DIY enthusiast.

Surveyor's qualified advice

Nevertheless, a surveyor stating limitations within a Building Survey or other type of survey report that it excludes detailed investigation of the wiring and giving the IEE's test-recommendation, should be able to provide qualified basic information and advice as a prelude to recommending up-to-date testing and a PIR.

General information

The following are relatively straightforward to establish:

- Does the supply enter as an overhead or underground system?
- Is it single (230v) or three-phase (440v) or one phase off a three-phase system?
- Are the circuits labelled at the distribution board to indicate what they serve?
- Are individual circuits protected by fuses; circuit-breaker mini-switches (mcbs) or a mixture?
- What is the earthing arrangement? For example, does the mains earth cable (striped yellow/green for post-1977 installations) originate as a connection to the neutral conductor, usually adjacent to the phase wire near the mains fuse; also known as 'protected multiple earth' (pme or TN-C-S system); or from an incoming metal cable sheath (TN-S); or does it originate from an independent earth electrode (TT system)?
- Are power circuits, such as those to power points used for electrical equipment outside the house, protected by residual current devices (rcds) or not?
- Is there evidence of work carried out since the first quarter of 2005 when 'Part P' was introduced under the *Building Regulations*, controlling significant alterations of an electrical system? If so, are 'Installation' and/or 'Minor Works Installation' certificates available? A hint of such work is where a kitchen, bathroom or conservatory has been refurbished or added since 2005.
- Are there underground or overhead services to outbuildings and how are the cables protected? [**Note**: Underground services should be routed in armoured cable (SWA) not plastic water-pipe].
- Do the meter and mains fuses carry the Distributor's seals or have these been removed? - an indication of unauthorised tampering!
- Are any bare wires or fittings visible and touchable - either around the meter, distribution board etc. or elsewhere in the building?
- Do electric cables run through insulation in the cavity walls, ceilings or roof void (and liable to potential overheating)?
- Are inset lights in ceilings surrounded by shrouds to protect against overheating and provide separation from insulating material? [**Note**: Even low voltage lights can overheat and cause charring or worse].

Residual current devices

Residual current devices (RCD; RCCB; RCBO)

These are protective devices but secondary to, and not a substitute for Earthing. The devices are easy to recognise because they are labelled as such. They also incorporate a mechanical test button, and when pressed should cause the switch to 'trip'. If it doesn't, say so in your report. However, before tripping the device, make certain that any power-sensitive equipment (computers, recording equipment etc) have been turned off. Also let the occupier know what you are doing, and don't forget to reset the switch afterwards, otherwise you may face a claim for a freezer-full of melted food.

A surveyor should also understand the function of an rcd and be able to explain its function to a client.

It acts in a different way to an ordinary circuit breaker, as it monitors differential flow between the current entering the circuit through the phase conductor and returning through the neutral. If a specified imbalance occurs, the switch trips within a fraction of a second, thereby disconnecting the circuit and rendering it safe.

An imbalance (leakage of current) will arise in the event of a short-circuit to earth, either resulting from a fault, or accidental human contact with a live conductor. [**Note:** 'Leakage' can also arise from other normally operating circuits (computers) but consideration is outside the scope of this article.]

Electric shock protection

The safety device operates on the basis that a healthy human body will generally survive an electric shock arising from current-flow of up to 30 milli-amps from a 230v domestic system not exceeding exposure of 0.4 second, and rcds in dwellings are set to protect critical circuits and operate at this level. The rating is marked on the face of the component - usually as 0.3A (≡ 30 milli-amp).

Electric circuits in particularly sensitive locations (for example, in an operating theatre) are protected by rcds of greater sensitivity (e.g. operating at a leakage current of 10mA (0.01A)).

	In instances where an 'earthing' facility is not provided by the distributor or service provider, earthing has to be provided by independent electrode (TT system) and all circuits require protection by an rcd, and will normally have two; a mains combined isolation switch/rcd rated to operate at a leakage current between 100 - 500mA (0.1 - 0.5A), with a protective subsidiary system for the critical circuits at 30mA. The difference in sensitivity is known as 'discrimination' so that in the event of a fault in a protected circuit, the 30mA rcd will 'trip' first and provide isolation nearest the fault, yet circuits on the 'upstream side' (lights, intruder and smoke alarms etc) will still remain in use.
Good value CPD	For those surveyors who wish to develop or improve their skills-base, courses on the 17th Edition wiring Regulations are worth considering with a City and Guilds qualification at the end (CG 2382-10). Clarkson Evans, for example, run CG 2382-10 as a 4-day course in one block or as evening courses of 9 separate sessions at a total cost of £395 + VAT.