

# ADEQUATE PROVISION OF ELECTRICAL SOCKET OUTLETS IN THE HOME



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## **INTRODUCTION**

The increased use of home electronics and entertainment systems had led to the situation that, not only are homeowners using extension leads for their TV area but also for many other areas in their homes. An increased socket outlets are always preferred by homeowners and clients; surveys have shown that 50% of new homeowners require additional socket outlets within twelve months of purchase of a new dwelling.

The ECA also anticipates the possible further increase for demand for even more socket outlets due to the PowerLine Communications Project (OPERA), currently being piloted throughout Europe.

PowerLine is a technology that allows voice, data, command and control signals to be transmitted over the existing electrical cables in our homes. It is not a new technology as it has been used since the 1970's for intercom and baby monitor systems. In recent years, manufacturers of PowerLine products became more adventurous and developed PowerLine products to transmit internet, telephone, television and distribute computer network signals over home and office power cables. The utility companies are also using the electricity grid to collect consumer usage information from domestic energy meters. Control and command systems also exist which provide an easy way to facilitate 'nice to have' features in the home.

So what is new? Well, in Europe, the EU issued the 'Communications Directive' requiring member states to provide broadband facilities in all domestic dwellings. In support of this, the EU launched a project called 'OPERA' as part of their Information Society Technology (IST) programme,

and have allocated €30m to help develop PowerLine technology including providing broadband via PowerLine.

In the USA, the Bush administration has decreed that all homes in the USA must have broadband via PowerLine by 2007. With that kind of backing, I am sure that PowerLine is a technology that will come of age and work well.

## **THE PARKER MORRIS REPORT**

A Report of the Electrical Installation Industry Liaison Committee, first published in 1977, made proposals for the minimum number of socket-outlets, which should be provided in homes. These proposals were made particularly on the grounds of safety – safety for the user, the installation itself, the home and of property – and for maintaining that level of safety during the life of the installation whilst allowing for the changing needs of the user.

This report is concerned with the minimum requirements for existing and foreseen standards of living and the use of electrical and electronic equipment in the average home. It is initially developed as an extension of the conclusions of the Parker Morris Report which was issued in 1961 and which is now obsolete. The use of such equipment in the home has increased very substantially as can be seen from the graph below. The minimum requirements advocated in this Report are to be found in Table 1.

Whilst Table 1 recommends minimum numbers for what would normally be considered adequate provision of socket outlets in the home, it should be noted that in Scotland, The Building Standards (Scotland) Regulations 1990 place statutory requirements for the provision of socket outlets. These are

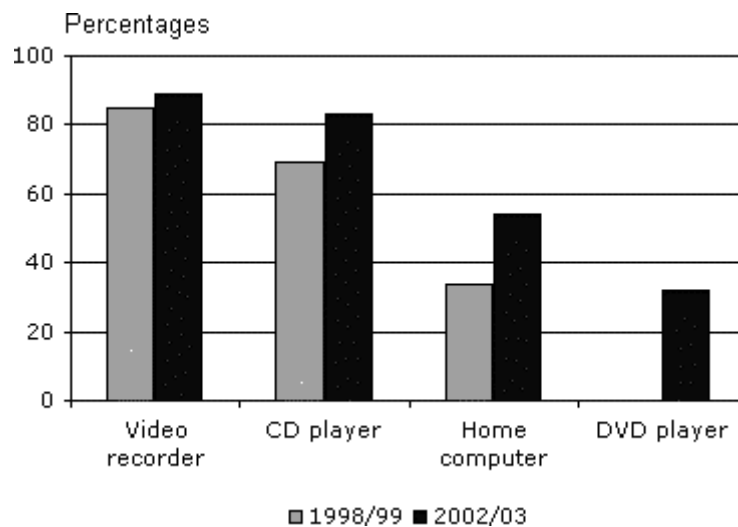
that every dwelling must be provided with at least 6 socket outlets (i.e. 3 twin sockets) in the kitchen, 4 socket outlets elsewhere. The requirements are set at a very basic level and clearly will be exceeded in all normal circumstances but it is important to recognise that they represent the legal minimum in Scotland.

The majority of homes in Britain have a floor area of 60-80 square metres and include two or three bedrooms. The recommendations in this Report apply primarily to these homes, as did the Parker Morris Report, although it has an application for both smaller and larger homes including single bedroom flatlets. The recommendations apply equally to new homes. It is also applicable to both Local Authorities' housing and that of the private sector.

### USE OF DOMESTIC APPLIANCES

The graph below shows how the ownership of major appliances has grown over the years. The graph does not include portable lamps. The use of these during the last 20 years has also increased considerably and it is not unusual to find two or three lamps plugged into sockets in the average living room. Neither does the graph include the whole range of small appliances which are in common use, e.g. plate warmers, hair curlers, air fresheners, cooking casseroles, frying-pans, grills, sandwich makers, slow cookers, rechargeable torches and many more.

### Percentage of Households with Consumer Durables, 1998-2003



A comparison of sales of all types of electric and electronic household goods between 1957 (£400 million) and 1984 (£5,000 million) indicates at least a fivefold increase in numbers of

appliances sold. On this basis alone, therefore, the number of sockets, which should be provided, compared with what was available in 1957, should be increased considerably.

In the last 30 years the use of electrical equipment for home entertainment has increased enormously. Three or more television sets in one home are not unknown, together with hi-fi/home cinema, tape and DVD/video recording equipment – usually permanently connected – and also the use of home computers and peripheral devices. Some electric equipment which was formerly battery operated is now available in a mains/battery form and this equipment is often connected to the mains.

### **SAFETY**

It has already been stated that the number of socket-outlets being advocated is primarily on the grounds of safety. The resulting dangers of not having sufficient socket-outlets may be summarised as follows:

- If there is no convenient socket at the location where the user wishes to use the appliance, he will almost certainly take steps to overcome the problem himself. This will either mean lengthening the flex or providing a ‘do-it-yourself’ extension to the socket. In both cases, there is a likelihood that this will not be done properly, resulting in a dangerous electrical situation often involving a loss of earthing at the point where it is required.
- If the longer flexes are provided there is a serious risk of these being stumbled over. Falls are the most common cause of accidents in the home. Such accidents are not considered ‘electrical accidents’. Long flexes placed under carpets, etc are equally liable to create a fire danger with continuous traffic over them and also lead to incorrect and hazardous use of mains connectors.

- With sufficient socket-outlets available adaptors may be used. Adaptors not designed for continuous loading of high current can overheat. Moreover, several appliances connected to the same socket mean that these may be left alive even though they are not in use, since there is no individual controlling switch. This is an additional danger, as is the possibility of overloading.
- There are two principal dangers arising from a poor electrical installation and associated equipment. They are either the personal risk of electric shock or the damage to individuals and property through fire. So far as the electric shock is concerned, there are no specific statistics available other than those of fatalities directly attributable to an electrical cause.

### **PART P OF THE BUILDING REGULATIONS**

From 1<sup>st</sup> January 2005 electrical installation work carried out in dwellings in England and Wales will become subject to Part P of the Building Regulations.

Part P imposes the requirement that:

**“Reasonable provision shall be made in the design, installation and testing of electrical installations in order to protect persons from fire or injury”.**

and that:

**“Sufficient information shall be provided so that persons wishing to operate, maintain or alter an electrical installation can do so with reasonable safety”.**

THESE REQUIREMENTS APPLY TO **ALL** ELECTRICAL INSTALLATION WORK CARRIED OUT IN DWELLINGS IN ENGLAND AND WALES. FAILURE TO MEET THESE REQUIREMENTS WILL BE A CRIMINAL OFFENCE.

In addition, as a consequence of Part P, from 1 January 2005 electrical installation work in dwellings in England and Wales will count as “building work”, as defined in the Building Regulations 2000, and hence should be notified to a Building Control Body before the work commences, unless:

- 1) **the proposed work is to be undertaken by a Competent Person (an individual or a company authorised to self-certify compliance on completion of the work); or**
- 2) **the proposed work is of a minor nature.**

Further information regarding Part P of the Building Regulations can be found at [www.partp.co.uk](http://www.partp.co.uk)

The recent review compiled by the Office of Deputy Prime Minister (ODPM) and the Fire and Rescue Service, provides statistics collated over a five year period from 1999 – 2004. In this period, deaths in the UK related to fire were in 1999 – 350, and in 2004 – 240 approximately.

In cases where there is no obvious source of the fire, incidents are often attributed to electrical faults. Over the period covered, there were on average 13500 fires in dwellings, which were attributed to an electrical source of ignition, with approximately 30 deaths per year attributed to electrical causes.

## **CONVENIENCE**

If socket-outlets are not conveniently placed to the user they will not be used. Also, unless they are reasonably placed along the wall and located on several walls in the room, the danger of trailing flexes will not be removed. Thirty five percent of families move house every 5 years or less and a further 23% move house at intervals of less than 10 years\*. Each family has a different arrangement of furniture and pattern of living. This point was made in the Parker Morris Report, but has seldom been taken note of. However, it is common experience that in every home there is at least one socket-outlet in the living area, which is unusable due to furniture being placed in front of it, and this frequently happens in bedrooms as well.

The diversity of utilisation of socket-outlets is further reduced due to items of electrical equipment being ‘permanently’ in use, such as freezers, refrigerators and DVD/Video recorders. With the increase in central heating installations there is a change in the pattern of use of socket-outlets. Electric fires are still used to provide a ‘top-up’ radiant heat or even only to provide the flame flicker effect, whilst the greater number of smaller appliances makes it necessary to have a better distribution of socket-outlets around the rooms.

\*“General Household Survey”. HMSO

## **THE COST**

For Local Authority dwellings, the percentage of the total cost of building a house, which is devoted to the electrical installations is not generally more than 5%, using the Parker Morris standard or similar. By comparison, if a central heating system was included the cost represented about 8% of the total. It is clear that to provide for the additional electrical installation

advocated in this Report would require a very small increase in the construction cost. Local Authority housing now currently accounts for only 20% of the national total of new building. Private sector housing covers a wide variety of types of housing from first buyer to luxury homes and thus, involves a range of socket-outlet installations according to type of property. Whilst the private sector is, therefore, more difficult to quantify, nevertheless, research indicates that there are often insufficient numbers of socket-outlets.

Over 50% of the installations in new housing are believed to have socket-outlet additions during the first 12 months, indicating a need for more socket-outlets and/or better siting of them at the initial installation stage. It will always cost less for these facilities to be provided in a new building than for them to be added at a later date. It is stressed, however, that the recommendations apply equally to desirable improvements in existing houses and rewiring as well as to new dwellings.

### **RECOMMENDED MINIMUM QUANTITY OF DOUBLE SOCKET OUTLETS FOR DWELLINGS**

**Table 1 – Minimum Number of Socket Outlets to be Provided in Homes**

All socket-outlets should be of the twin switched type

<b>Room Type</b>	<b>Smaller Dwellings Rooms Typically 4-12m<sup>2</sup></b>	<b>Medium Dwellings Rooms Typically 9-25m<sup>2</sup></b>	<b>Larger Dwellings Rooms Typically 25-225m<sup>2</sup></b>
Main Living Room (see Note 4)	4	4	6
Dining Room	3	3	4
Single Bedroom	2	3	3
Double Bedroom	3	3	3
Studies	4	4	6
Utility Rooms	3	4	4
Kitchens (see Note 1)	6	8	10
Garages (See Note 5)	1	1	2
Conservatories	2	3	4
Halls (*See Note 4)	1	2	2
Lofts	1	1	1

**Note:** In accordance with BS 7671 (Regulations for Electrical Installations) all socket outlets likely to supply portable equipment used outdoors must be protected by a 30mA residual current device.

**Notes:**

1. **Kitchen** – if a socket-outlet is provided in the cooker control unit, this should not be included in the 6 recommended in the Table above.

The socket-outlets are primarily for portable appliance connections. Fixed appliances should have appropriate additional outlets. Some appliances such as a central heating boiler are likely to require an additional socket-outlet, which should be borne in mind in the initial installation design. It has been shown as a separate item in the schedule, as its location can vary according to the dwelling.

Fixed equipment such as Immersion Heaters should not be connected via socket outlets: a separate circuit should be provided, incorporating a double pole switch of appropriate rating.

Rule of thumb as follows:

- Allow 0.8 to 1 double sockets per linear metre above worktop (minimum)

2. **Garage** – The number of socket-outlets specified allows for the use of a battery charger, tools, portable light and garden appliances. It is important that this circuit be protected by a high sensitivity residual current device (earth leakage circuit breaker).
3. **Single Bedroom** – it is envisaged that this room will be used in different ways in different households. It may be used simply as a child's bedroom requiring socket-outlets for table lamps, an electric blanket and a fire only; or it may serve as a teenager's bedroom and living room combined, where friends are entertained. In this case, socket outlets may be needed for hifi/home cinema system, hairdryer, television and radio, in addition to lamps, a blanket and a fire.

The room may also be used as a student's bed sitting room, in which case socket-outlets may be needed for a grill or toaster, iron, hi-fi equipment, home computer and a kettle, in addition to items already mentioned. If the room is used for the latter purpose, the minimum number of twin outlets should be increased to 4, as shown in the Table above.

4. **TV entertainment areas** – it is recommended to install two double socket outlets in these areas as a minimum; this is in addition to other socket outlets in the room.
5. **For high specification properties** – a good specification for general rooms is to install a double socket outlet in each corner of the room.
6. **Halls** - single socket outlets may be fitted as an alternative in halls.
7. **30mA RCD** protecting required in line to BS 7671.