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Custom-engineered equipment and EMC compliance

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## Custom-engineered equipment and EMC compliance

Keith Armstrong describes how you can reduce the burden of documentation for equipment that is designed specifically for specified 'fixed installations' under the terms of the latest EMC Directive, 2004/108/EC, which came into effect in July last year

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Equipment or systems for incorporation into 'fixed installations' can be classified under the new EMC Directive (2004/108/EC, which came fully into force on the 20<sup>th</sup> July this year) as either:

- a) Apparatus that is placed on the EU market, CE marked, commercially available for an end-user.
- b) Apparatus that is intended for incorporation by its end-user into a given fixed installation and is not otherwise commercially available.

Anything sold to a customer who is not its end-user, does not have to comply with the EMC Directive.

**a):** Must comply with Articles 7-9 of the new EMC Directive, which includes an EU Declaration of Conformity and CE marking. The corresponding UK requirements are Clauses 15-22 of the 2006 EMC Regulations (S.I. 2006 No.3418, available from [www.opsi.gov.uk/si/si2006/ukxi\\_20063418\\_en.pdf](http://www.opsi.gov.uk/si/si2006/ukxi_20063418_en.pdf)).

Almost all electrical or electronic products sold in shops or by distributors will follow this compliance route. They will either pass the full suite of EMC emissions and immunity tests, or else have 'Technical Documentation' that includes a technical argument for compliance with the Directive's EMC Protection Requirements. Testing a control panel in an independent test laboratory typically costs at least £2,000, but testing costs can be significantly reduced by doing them in-house.

Under the original EMC Directive, technical arguments for compliance had to be assessed by a government-appointed 'EMC Competent Body', as part of a 'Technical Construction File'. But under the new EMC Directive they have all been replaced by 'EMC Notified Bodies' whose involvement with the Technical Documentation is solely at the discretion of the manufacturer.

It is possible to employ cost-effective 'good EMC procedures' in management, design, purchasing, assembly, installation and testing that will ensure compliance for a wide range of products or systems, considerably reducing the amount of Technical Documentation required by each project.

**b):** Must be an equipment or system specially designed and manufactured for a specified fixed installation. We typically say they are 'custom-engineered' or 'bespoke', and they are always made to special order. According to the EC's draft Guide to 2004/108/EC there will always be a direct relationship between its manufacturer and end-user (the final customer).

For this category, Article 13 of 2004/108/EC or Clause 34 of the 2006 EMC Regulations allow the manufacturer to follow a 'reduced compliance regime' that does not require:

- Compliance with the EMC Protection Requirements
- Any conformity assessment procedures (e.g. EMC testing, technical arguments, etc.)
- An EU Declaration of Conformity, or CE marking (although these may be needed by other Directives, e.g. the Low Voltage Equipment (safety) or Machinery Safety directives.)

Such an equipment or system could have any EMC characteristics and could even cause or suffer interference – *however* – it *must* be provided to their end-user with documents that:

1. Identify the fixed installation it is intended for (e.g. by its street address)
2. Identify the EMC characteristics of the fixed installation it is intended for
3. Indicate the precautions to be taken when incorporating it into the fixed installation so as not to compromise *its* compliance with the EMC Directive
4. Uniquely identify the equipment or system (e.g. by serial number)

5. Give its manufacturer's name and address (or that of its agent or EU importer)

Items 2 and 3 in the above list mean that it is not possible for a custom manufacturer to avoid doing some EMC compliance work. The EC's draft Guide to the new EMC Directive gives these examples of information that should be provided:

- The required use of additional auxiliary devices (e.g. protection devices, filters etc.)
- The specifications and length of the cables required for external connections
- The conditions for use (e.g. limits for proximity of walkie-talkies, cellphones, ISM equipment, etc.)
- Any special precautions for EMC (e.g. creation of an RF Reference, etc.)

The DTI's guide to the UK's 2006 EMC Regulations ([www.dti.gov.uk/files/file38031.pdf](http://www.dti.gov.uk/files/file38031.pdf)) adds that the manufacturer must understand the nature of his customer's fixed installation in sufficient detail to specify the precautions for incorporation to avoid compromising its EMC compliance.

It is not enough to provide a set of general EMC instructions, they must be tailored to the EMC characteristics of each customer's site. For example, where a fixed installation already has a high level of emissions at a particular frequency, the instructions provided with the new equipment or system should ensure that its emissions will not cause the installation's aggregate emissions to exceed the permitted limits at that frequency.

There is no legal obligation for an end-user to provide a supplier with any EMC information on their fixed installation. Where a manufacturer finds it impossible or impractical to determine the EM characteristics of his customer's fixed installation in sufficient detail to specify the installation precautions, he should follow the 'normal' route in a) above.

For those who wish to investigate further, the Directives and Regulations, and their official guides, plus a great deal of useful and practical information, are available as described in the document: '*Some Useful References on EMI and EMC*', posted on this site.