

## Distribution Code Consultation Response Proforma

### DCRP/21/04/PC: Engineering Recommendation (EREC) G12 Issue 4 Amendment 2

#### *Requirements for the Application of Protective Multiple Earthing to Low Voltage Networks*

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Stakeholders are invited to respond to this consultation, expressing their views or providing any further evidence on any of the matters contained within the consultation document. Stakeholders are invited to supply the rationale for their responses to the set questions.

Please send your responses and comments by **17:00 on 7 May 2021** to [dcode@energynetworks.org](mailto:dcode@energynetworks.org) and please title your email:

**‘Consultation Response DCRP/21/04/PC EREC G12 Issue 4 Amendment 2’.**

Please note that any responses received after the deadline may not receive due consideration by the Working Group.

Any queries on the content of the consultation pro-forma should be addressed to DCode Administrator on 020 7706 5100, or to [dcode@energynetworks.org](mailto:dcode@energynetworks.org)

<b>Respondent</b>	Jonathan Elliott
<b>Company Name</b>	Certsure LLP
<b>No. of DCode Stakeholders Represented</b>	
<b>Stakeholders represented</b>	Circa 36,000 registered electrical contracting businesses on NICEIC and Elecsa branded registration schemes
<b>Role of Respondent</b>	Registration body. Training provider
<b>We intend to publish the consultation responses on the DCode website. Do you agree to this response being published on the DCode website? [Y/N]</b>	Yes

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	Question	Response
Q1	Do you agree that the proposed amendments to EREC G12 Issue 4 achieve the Distribution Code Objectives?	Partially. We have concerns over a number of areas including the blanket assumption that all instances of PNB should be treated as PME. We are also concerned about the measures proposed in respect of the installation of electric vehicle charging points.
Q2	Do you agree with the proposed text contained in EREC G12 Issue 4, or do you have any alternatives to propose?	Partially. We have submitted a number of comments relating to the draft.

Please provide comments relating to the specific technical content of the EREC<sup>1</sup>

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<sup>1</sup> Add more rows if required.

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6	Foreword		General	<p>Given that no product standard exists for 'open PEN' devices currently and also given the limitations of the effectiveness of such devices it seems premature to recognize their use to mitigate for open-PEN faults on the network.</p> <p>The IET have agreed to organize a second HSL report into the actual degree of risk posed to those interacting with EVs under open-PEN fault conditions. The conclusions of this research will be taken into account by JPEL/64 when updating the requirements for electric vehicle charging installations given in section 722. We would recommend that G12/4 should not include recommendations pertaining to the use of open-PEN devices until after the findings of this new research are published.</p>	To remove reference to 'neutral disconnection devices' until the publication of the second HSL report and the production of a product standard for such devices.	
16	4.9	Table 4.9a	Technical	It was agreed at ENA/IET liaison meeting to delete the examples from the bottom left-hand cell	<p>To amend text in bottom left-hand cell to read:</p> <p>'At consumers' premises the main equipotential bonding connections between the earthing terminal and all extraneous-conductive-parts.'</p>	

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17	4.11		Technical	<p>A protective neutral bonding (PNB) arrangement may, in respect of the installation connected to it, be either TN-C-S or TN-S depending on the location of Earth to the neutral conductor. Moreover the risk associated with diverted neutral current under open-PEN conditions also varies dependent on the position of this connection.</p> <p>As such, it is not technically justifiable to state that where PNB is employed 'Earth terminals provided using PNB shall be treated in all respects as PME earth terminals.'</p>	To remove this statement and to replace with guidance which more accurately reflects the situation dependent on the location of where the Earth is connected to the neutral conductor.	
18	5.2.1	1 <sup>st</sup> bullet point	Technical	This currently states 'their earthing installation is not designed to BS 7671'. In the context of this section of G12/4, it should really state that 'the main protective bonding of the installation does not meet the requirements for BS 7671 for where PME conditions apply'.	To amend first bullet point to read: - the main protective bonding of the installation does not meet the requirements for BS 7671 for where PME conditions apply.	
18	5.2.1	Last para	Technical	<p>This states that 'Where a metallic gas service is provided to a consumer's premises with a PME earth terminal, an insulated insert should be fitted in the gas service.'</p> <p>This seems to ignore that for some time now most gas supply is via non-metallic pipe. It is also contrary to current British Gas policy, which requires the removal of insulating inserts as these are 'non-standard equipment'</p>	To update guidance to reflect current gas supply practice.	

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18	5.4		Editorial	<p>It would be more correct if this stated 'Where a PME Earth terminal has been provided to a consumer' rather than the current statement 'Where PME facilities are available to a consumer'.</p> <p>Whilst recognizing that the PME Earthing facility may not be employed for all or part of the installation, an electrical contractor carrying out work or reporting on an electrical installation wants to know what earthing arrangement <i>has been</i> provided by the distributor and not what <i>might be</i> available.</p>	<p>To amend to read:</p> <p>'Where a PME has been provided to a consumer, a label shall be affixed at the service position drawing attention to the fact that the service is connected to a network having protective multiple earthing.'</p>	
18	5.4		General	<p>We are aware of a number of 'PME labels' being used by various DNOs. Some are better than others at informing those carrying out work or reporting on an electrical installation who need to know what earthing arrangement has been provided by the distributor.</p> <p>In order to ensure consistency as much as possible geographically, we would recommend that a 'model label' was included in section 5.4 with a standard wording for use by all DNOs.</p>	<p>To provide an example label to be used to identify where a PME earthing facility has been provided at an installation stating the following or similar:</p> <p><b>WARNING</b>  <b>This installation is connected to a network with protective multiple earthing.</b></p>	

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22	6.2.2.2		General	The statement 'There shall be no exposed-conductive-parts before and/or enclosing the RCD.' Does not align with regulation 531.3.5.3.2.201 of BS 7671, which does not prohibit enclosure of an RCD in a metallic enclosure. There is no special requirement in Section 704 other than requiring all assemblies for the distribution of electricity on construction and demolition sites to be in compliance with the requirements of BS EN 61439-4 (regulation 704.511.1)	To reconsider wording of this section:  'The supply must be protected in accordance with BS 7671; this will usually include a residual current device (RCD) on the consumer's side of the cut-out. Particular attention should be paid to regulation 704.511.1 in respect of assemblies for the distribution of electricity on construction and demolition sites.'	
22	6.2.3.1		Editorial	This section could include a cross-reference to 711 of BS 7671	To include after current text:  'See also Section 711 of BS 7671.'	
22	6.2.3.2		Editorial	The cross-reference in this section to BS 7909 is not correct. The scope of BS 7909 only covers mobile and transportable units with electrical installations that are used in the entertainment and similar or related industries. This should be clarified in this section.	To amend to read:  'Further guidance on the connection of mobile or transportable units that are used in the entertainment and similar or related industries to existing installations can be found in BS 7909.'	

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22	6.2.3.2		Editorial	The summary of the requirements of regulation 717.411.4 in section 717 will be incorrect when AMD2 of BS 7671 is published in 2022.	To align text with that agreed for AMD2 of BS 7671: <ul style="list-style-type: none"> <li>‘where the installation is continuously under the supervision of a skilled person (electrically) or instructed person (electrically), competent in such work and the suitability and</li> <li>The effectiveness of the means of earthing has been confirmed before the connection is made, or</li> <li>the unit is located within, or outdoors on an upper storey or roof of, a building or structure containing the electrical installation which supplies the unit.’</li> </ul>	
24	6.2.5		Editorial	The guidance in the second paragraph referring to Section 702 of BS 7671 is incorrect in that the note in BS 7671 actually recommends that where PME (TN-C-S) earthing is adopted, an earth mat or electrode should be installed. This doesn't necessarily need to be installed exclusively in zone 2 though. The matter is addressed better later in the same section.	To delete:  BS 7671 recommends that where PME (TN-C-S) earthing is adopted, an earth mat or electrode should be installed for Zone 2.	
26	6.2.8	Note	General	The note currently refers to section 110.1 of BS 7671.  It might be better for it to refer to 110.1.3 and 110.2	To amend note to read:  The requirements for supplies to the working areas are covered by specific statutory legislation (see BS 7671, regulations 110.1.3 and 110.2).	
27	6.2.14	5 <sup>th</sup> para	Editorial	To change 6mm <sup>2</sup> to 6mm <sup>2</sup>	To change 6mm <sup>2</sup> to 6mm <sup>2</sup>	

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31	6.2.16	1 <sup>st</sup> para	Technical	As written the scope of this section seems to not apply to EV charging points on, for example, private driveways and other locations they wouldn't constitute a street electrical fixture and are not connected to a street electrical fixture. We believe it is correct to distinguish between such domestic EV charging points and those located elsewhere, but feel it would be better to be more explicit in making this distinction.	To clarify that this section does not apply to EV charging points in locations such as private driveways.	
32	6.2.16	1 <sup>st</sup> para on page	General	It has been agreed to remove indent (i) of regulation 722.4.1 which permits use of PME where the EVCP is connected to an installation deemed sufficiently balanced.	To delete:  'Where the EVCP is of Class I construction as defined in BS 7671, a PME earth terminal may be provided if the requirements of BS 7671 are satisfied and the connection point presents a 3-phase balanced load.'	
32	6.2.16	2 <sup>nd</sup> para on page	Technical	Subject to the results obtained by the second round of HSL research, the jury is out as to whether 'The risk of a neutral fault on EVCP installations is sufficient to classify them as special situations where the consumer must utilise an additional or alternative form of protection to PME.' Moreover, to be technically correct, the neutral fault is not on the EVCP installation, it is imposed on it by a fault on the supply network – outside of the electrical installation	To delete the following text until the results of the 2 <sup>nd</sup> round of HSL research have been published:  'The risk of a neutral fault on EVCP installations is sufficient to classify them as special situations where the consumer must utilise an additional or alternative form of protection to PME.'	

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32	6.2.16.1	1 <sup>st</sup> para	Technical	<p>Although not an authority on electric vehicle construction, We are not aware of any such vehicles being declared as of Class II construction.</p> <p>Moreover, apart from those on private domestic properties, the nature of the EV that might want to plug in to charge is an unknown.</p> <p>This is an unrealistic statement and should not be included.</p>	<p>To delete 'and the associated vehicle' to read:</p> <p>'A mains-derived earthing terminal is not required for Class II installations. EVCPs should preferably be of Class II construction or equivalent as defined in BS 7671.'</p>	
32	6.2.16.1	2 <sup>nd</sup> para	Technical	<p>Conversion to a TT system earthing arrangement as an alternative to using the PME earth can introduce risks both during installation of the electrodes and thereafter if the separation of earthing arrangements is not done correctly.</p> <p>It is our view therefore that conversion to TT may introduce more risk than using the PME earthing facility</p>	<p>To strengthen the wording to:</p> <p>'A correctly installed TT system earthing arrangement meeting all relevant requirements of BS 7671 may be a suitable alternative earthing arrangement.'</p>	
32	6.2.16.1	2 <sup>nd</sup> para	Technical	<p>The statement is made, in respect of on-street locations that 'where individuals are likely to be wearing footwear and standing on high resistance surfaces such as tarmac , separation between the TT earth and underground metallic services is not considered necessary. He statement is made 'where individuals are likely to be wearing footwear and standing on high resistance surfaces such as tarmac , separation between the TT earth and underground metallic services is not considered necessary.'</p> <p>This is also true of most other locations where an EVCP might be located.</p>	<p>To amend to read:</p> <p>Due to the higher tolerable voltages at locations where individuals are likely to be wearing footwear and standing on high resistance surfaces such as tarmac , separation between the TT earth and underground metallic services is not considered necessary.</p>	

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32				Subject to the results obtained by the second round of HSL research, the jury is out as to whether any additional form of protection is required.	To delete the following text until the results of the 2nd round of HSL research have been published:  Where it is not reasonably practicable to install a TT system earthing arrangement at on-street locations, an additional form of protection should be installed.	
32	6.2.16.2	2 <sup>nd</sup> para	Technical	This states that: 'For an EVCP installation the contact by a member of the public to the charging point, to connect and disconnect the vehicle and to the vehicle (which will become an extension of the charging point installation) will be frequent and less fleeting in nature than for a typical street electrical fixture installation'. How long does it actually take to (un)plug an EV? Is the plug and associated flexible cable energised when the plug is inserted/removed and even if yes, should it be? How effective is the contact to the EV during insertion/removal? Do you hold the plug and/or the car body? Is the car body conductive? The criteria used in BS 7671 have assumed 'water-wet' conditions. Indent (ii) of regulation 722.411.4.1 permits the use of a supplementary electrode.	To reconsider the content of this paragraph taking into account all the factors which come into play in respect of the nature and duration of contact when interacting with an EV.	
32	6.2.16.2	3 <sup>rd</sup> para	Technical	Open-PEN devices do not provide protection against shock. They will disconnect the supply within 5 seconds however within that period a shock risk exists. It is a very different concept to that of additional protection by an RCD wherein, the time of exposure to an electric shock is controlled to a very short duration (within 0.04 seconds).	To amend to read:  Currently BS 7671 section 722 permits the protection against Open PEN fault conditions to be provided by the use of a protective device which responds to an open neutral condition.	

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32	6.2.16.2	4 <sup>th</sup> para	Technical	This paragraph is problematic. All that needs to be said is that the installation meets the relevant requirements of BS 7671, which is already covered elsewhere.	To delete:  Where an open neutral detection and earth disconnection device is used as the additional form of fault protection the designer, installer and owner of the consumer's installation must ensure that the device is designed, installed, maintained and operated to protect members of the public from the risks associated with the rise of voltage on the installation earth terminal in the event of an open neutral condition.	
32-33	6.2.16.2	Last para	Technical	We are not aware of any manufacturer of open-PEN devices who have had independent test centres carry out type testing and certification of their products. So does the statement relating to this in effect mean any products which have not been subjected to such investigation cannot be used?	?	