

# Distribution Code Consultation Response Proforma

DCRP/17/03: Engineering Recommendation P25

The short-circuit characteristics of single-phase and three-phase low voltage distribution networks.

The following comments were received during the DCODE Consultation which occurred 17<sup>th</sup> March to 14<sup>th</sup> April 2017.

Page No line	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
<b>BEAMA (Raj Vagdia) Comments</b>						
Line 296	5.3	Indent b), 2 <sup>nd</sup> line	T	'phase-to-phase voltage' should read as 'line-to-line voltage', to be consistent with the terminology used in BS 7671. (BS 7671 no longer uses the term 'phase conductor'; it uses 'line conductor' instead.)	Change 'phase-to-phase voltage' to 'line-to-line voltage'.	Noted. However, 'phase' is well understood and commonly used.  'Line' is sometimes used in electricity industry to refer to an overhead conductor.
Line 302	5.3	In the box containing formula for PSCC for a three-phase fault	T	'phase-to-neutral voltage' should read 'line-to-neutral voltage', to be consistent with the terminology used in BS 7671. (BS 7671 no longer uses the term 'phase conductor'; it uses 'line conductor' instead.)	Change 'phase-to-neutral voltage' to 'line-to-neutral voltage'.	Noted. No change.

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Line 302	5.3	In the box containing formula for PSCC for a single-phase (phase-earth) fault	T	In the heading, 'PSCC for single-phase (phase-earth) fault' should read 'PSCC for single-phase (line-earth) fault', to be consistent with the terminology used in BS 7671. (BS 7671 no longer uses the term 'phase conductor'; it uses 'line conductor' instead.)	In the heading, change 'PSCC for single-phase (line-earth) fault' to 'PSCC for single-phase (line-earth) fault'.	Noted. No Change.
Line 302	5.3	In the box containing formula for PSCC for a single-phase (phase-earth) fault	T	'phase-to-neutral voltage' should read 'line-to-neutral voltage', to be consistent with the terminology used in BS 7671. (BS 7671 no longer uses the term 'phase conductor'; it uses 'line conductor' instead.)	Change 'phase-to-neutral voltage' to 'line-to-neutral voltage'.	Noted. No Change.
Line 306	5.4		Tech	The increase from 16 kA to 19.6 kA may result in the unnecessary specification of 19.6 kA rated equipment, whereas the related product standard for a consumer unit (BS EN 61439-3 Annex ZB) prescribes a conditional 16 kA rating.	Add text shown in italic:  The maximum design value of the PSCC for single-phase 230 V supplies should be taken as 19.6 kA at the connection of the service to the LV distribution main. <i>19.6 kA is based on zero metres of service cable. In practice the service length will be at least 2 metres, which reduces the PSCC to less than 16 kA as can be seen from Table 1. Therefore, for Consumer Units, the 16 kA conditional rating in Annex ZB of BS EN 61439-3 is adequate (see 8.2).</i>	Accepted.  New Note added to Clause 5.4.  <i>NOTE: The value of 19.6 kA assumes zero metres of service cable/overhead line is connected. In practice, the service length will be at least greater than 2 metres, reducing the PSCC to less than 16 kA (see Clause 7.2 and Table 1). Therefore, the 16 kA conditional rating described in Annex ZB of BS EN 61439-3, for incoming service equipment, will satisfy design requirements.</i>

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Line 432	7.3		T	'phase conductors' should read 'line conductors', to be consistent with the terminology used in BS 7671. (BS 7671 no longer uses the term 'phase conductor'; it uses 'line conductor' instead.)	Change 'phase conductors' to 'line conductors'.	Noted. No Change.
Line 505	8.1	Note	Tech	Reference to the Electrical Contractors' Association (ECA) Guide to the Wiring Regulations is not appropriate, as it is not the only authoritative guide on circuit-breaker selection or testing. If a guide must be referenced, PD IEC/TR 61912-1 should be identified.	Delete note or replace ECA with PD IEC/TR 61912-1.	Accepted. Note amended to read <i>PD IEC/TR 61912-1 provides guidance on circuit-breaker ratings, which may prove informative. The designer should take responsibility when ascertaining the required rating of protective devices.</i>
Line 512	8.2		T	Regulation 435.5.1 does not appear to be the most appropriate regulation to refer to in the context of what is being said in clause 8.2. The most appropriate regulation to refer to would appear to be Regulation 434.5.1. Also, the correct name for a clause of BS 7671 is 'Regulation', not 'Clause'.	Change '(see BS 7671 Clause 435.5.1)' to '(see BS 7671 Regulation 434.5.1)'.	Accepted. Change completed as proposed.
Line 519	8.2		Tech	For clarity, the 16 kA conditional rating needs to be shown.	Add 16 kA as shown in red:  In order to assist designers in selecting protective devices in conjunction with the limitation in energy let-through of the DNO cut-out fuse-link, the <b>16 kA</b> conditional testing procedure has been established in Annex ZB of BS EN 61439-3.	Accepted. Change completed as proposed.
Line 525	8.3		T	'phase-to-phase fault' should read 'line-to-line fault', to be consistent with the terminology used in BS 7671. (BS 7671 no longer uses the term 'phase conductor'; it uses 'line conductor' instead.)	Change 'phase-to-phase fault' to 'line-to-line fault'.	Noted. No Change.

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<b>Northern Powergrid comments</b>						
	5.2	Fig 3B	E	The drawing title is missing, as is the label 'DC component IDC of the short-circuit current'. Some of the labels are of poor quality and difficult to read	Update drawing and title	Noted. Figure 3B checked for formatting and improved as required.
	7.3	Table 2	T	Table 2 doesn't have entries relating to 70 or 150 mm <sup>2</sup> Al. Table 3 provides equivalent metric cable sizes e.g. 0.2 in <sup>2</sup> Al is equivalent to 150mm <sup>2</sup> but Table 2 is incomplete and can't actually be used for all the imperial cables included in Table 3	Might it be possible to add some extra columns to Table 2	Noted. The variation in values between 70 and 95 and also between 120 and 150 is unlikely to be significant. The main variable affecting accuracy when using the table will be in the estimation of service length.  No change.
	5.1 & others		T	Parag 5.1 suggests that a designer caters for the maximum PSCC. Parag 5.4 and 5.5 states that these are 19.6kA for single phase and 25.9kA for a three phase connection to the LV busbar. Section 7.1 to 7.3 explains how these values will be attenuated. Section 7.4 then states that if there are synchronous or asynchronous machines connected to the network the contribution from these machines should be assessed.	As most LV networks have some embedded generation, would it be worth suggesting that a designer should ask the DNO for information on the quantity of generation connected to a LV network when it might be above a deminimis value – i.e. how would a designer know whether there is a need to undertake a bespoke assessment rather than use the standard 19.6 / 25.9kA figures	Noted.  A short paragraph has been added to Clause 5.1.  <i>The designer should request/obtain information from the appropriate DNO to enable an estimation of the LV generation/motor contribution. The estimation may not be necessary if the suggested criteria in Clause 7.4 for LV generation/motor contribution is not surpassed.</i>  A new NOTE has been added to Clause 7.4.1 to provide guidance on interpreting available headroom on maximum fault levels against machine contribution.

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<b>WPD comments</b>						
17	302		E	NOTE: Zsc is the sum of the phase resistance and phase reactance.	Add the term "phase"	Accepted. Terminology corrected.
<b>SELECT (The Electrical Contractors Association of Scotland) comments</b>						
1		Title	Technical /Editorial	The document title does not reflect the presence of a neutral conductor.	Suggest the title is amended to include 'single-phase and neutral (SP&N) and three-phase and neutral (TP&N) low voltage distribution networks'	No change. The document title is not intended to capture scope. Application of document is clearly stated within Scope and Clause 4.
7	Line 36 to line 39		Editorial	Regulation 612.11 is not quoted as per BS 7671:2008+A3:2015	delete 'at the supply terminals' and replace with 'at the origin and at other relevant points.'  Note: Regulation numbering may change with the introduction of the proposed 18th edition of IET Wiring Regs to be published June 2018 so references like this may quickly become out of date.	Noted.  Reference to Regulation 612.11 deleted.  No change to wording as it is not intended to directly quote BS 7671. The term 'supply terminals' is defined in P25 and hence linked to 'origin of installation'.
7	Line 40 to line 41		Editorial	Reference to 'the maximum earth loop impedance is as per quoted in ESQCR however I think that the correct terminology is 'earth fault loop impedance'	Change 'earth loop impedance' to 'earth fault loop impedance'	No change. Terminology is correct as per ESQCR.
8	Line 88		Technical	The definition of LV is not technically correct	I suggest this is aligned with the definition in ESQCR  'a voltage exceeding 50V but not exceeding 1000V measured between phase conductors'	Part accepted.  Definition changed to:  <i>voltage above 50 V a.c. r.m.s. but not exceeding 1 000 V a.c. r.m.s.</i>

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9	Line 129		Technical	'Prospective fault current (I <sub>pf</sub> )' as defined in BS 7671 includes not only fault current between live conductors but also between live conductors and an exposed-conductive-part.	Amend the definition to 'Prospective fault current (I <sub>pf</sub> )' as per BS 7671 or remove Note 3 ?	Accepted. NOTE 3 amended as proposed.
11, 13 and 26	Line 197 and line 199 also Line 231 and 489		Editorial	I would question the use of the terminology 'customers installation' – the meter supplier may be a different organisation from the DNO.	Suggest the correct terminology is 'consumers installation'	Noted.  The choice of customer vs consumer has been debated by the DNOs.  No change as proposed.  It is intended that the definition of 'customer' will ensure no mis-interpretation.
26	Line 505		General	The 'ECA Guide ' mentioned may now be out of date and has not been updated to reflect BS 7671:2008+A3:2015	Remove mention of publication	Accepted. Reference to ECA guide removed.
17	Line 306		Technical	Is the value of PSCC given correct ? Most single phase installations have a PSCC far less than this value or even the 16kA given as maximum design value in IET publications,	Suggest a note to clarify why the change from previous industry values if correct.	Accepted. New Note added to Clause 5.4.  <i>NOTE: The value of 19.6 kA assumes zero metres of service cable/overhead line is connected. In practice, the service length will be at least greater than 2 metres, reducing the PSCC to less than 16 kA (see Clause 7.2 and Table 1). Therefore, the 16 kA conditional rating described in Annex ZB of BS EN 61439-3, for incoming service equipment, will satisfy design requirements.</i>

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Subsequent to the comments and amendments above, P25 draft was amended and circulated to the Working Group on 01/09/17 (draft file name – ENA\_EREC P25\_Issue 2\_(2017)\_Final\_v4\_Issued

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<b>ENA comments (David Crawley)</b>						
		Intro	T/E	ESQCR – There are separate ESCQ regs for Northern Ireland (2012) – these should be referenced unless the document is not intended to apply in NI.		No change. Reference to Northern Ireland ESQCR already included in document.
		3	E	Definitions of quantities - the italic symbols, font and subscripts should line up with those further on in the document especially those in Figure 3 which has been taken from BS EN 60909-0  This also applies to elsewhere in the documents where the various quantities are mentioned.		Accepted. All symbols amended to italic font throughout document.
		Figure 3		iDC in the key (lower case) does not match IDC (upper case) in the Figure		Accepted. All instances of <i>idc</i> amended to <i>I</i> dc
	5.3	Inset formula box	E	Key and formula symbols fonts and italicisation need to be consistent in this box		Accepted. Font amended as suggested.
	5.4	NOTE	E	If the words “greater than” are inserted, the words “at least” should be deleted to avoid tautology		Accepted. The words ‘at least’ have been deleted.
	7.3	Para 2	E	Delete “the” before “Table 2”		Accepted. Amended text.
	7.3	Para 3	E	Change “Tables 2 to “Table 2”		Accepted. Amended text.
	7.3	Para 4	E	Change “Tables 2 to “Table 2”		Accepted. Amended text.

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<b>WPD</b>						
	7.4.1	NOTE		The words 'It may be likely' should be replaced with 'It is likely'.		Accepted. Wording amended.