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CP1553 'Tightening the requirements for the minimum accuracy classes for Meters in CoP 5 and Current Transformers in CoPs 3, 5, and 10'

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About This Document



Not sure where to start? We suggest reading the following sections:

- Have 5 mins? Read section 1
- Have 15 mins? Read sections 1, 4, 5 and 6
- Have 30 mins? Read all sections
- Have longer? Read all sections and the annexes and attachments

The purpose of this CP1553 CP (Change Proposal) Consultation is to invite BSC Parties, Party Agents and other interested parties to provide their views on the impacts and the merits of CP1553. The Imbalance Settlement Group (ISG) and Supplier Volume Allocation Group (SVG) will then consider the consultation responses before making a decision on whether or not to approve CP1553.

There are six parts to this document:

- This is the main document. It provides details of the solution, impacts, costs, and proposed implementation approach. It also summarises the ISG's and SVG's initial views on the proposed changes.
- Attachment A contains the CP1553 proposal form.
- Attachments B-D contains the proposed redlined changes to deliver the CP1553 solution.

- Attachment E contains the specific questions on which we seek your views. Please use this form to provide your response to these questions, and to record any further views or comments you wish to be considered.



Central Data Collection Agent (CDCA)

The CDCA retrieves, validates and processes metering data metered data from Half Hourly Meters comprised in Central Volume Allocation (CVA) Metering Systems.

Why change?

The metering Codes of Practice (CoPs) detail the standards and minimum accuracy classes for certain Metering Equipment, i.e. for Meters, current transformers (CTs) and voltage transformers (VTs).

Currently, the minimum accuracy class required for a Meter in [CoP5 'the metering of energy transfers with a Maximum Demand of up to \(and including\) 1MW for Settlement Purposes'](#) is class 2¹ (or class A²), which means that the Meter must have an accuracy within $\pm 2\%$ over most of its current range³. However, the overall accuracy limit for a CoP5 Metering System is $\pm 1.5\%$ ⁴. This makes it difficult for Meter Operator Agents (MOAs) to assure overall accuracy of a Metering System is met, if they do not, or cannot, provide Calibration Certificates, for certain items of Metering Equipment. Calibration Certificates detail the actual errors obtained through testing. This can result in the Technical Assurance Agent (TAA) assigning a category 2 non-compliance⁵ for overall accuracy not being maintained.

Additionally, the minimum accuracy class for a CT in [CoPs 3 'the metering of circuits not exceeding 10 MVA for Settlement purposes'](#), 5 and 10 ['the metering of energy via low voltage circuits for Settlements Purposes'](#) is class 0.5⁶. This standard requires class 0.5 CTs to be tested to a minimum of 5% of rated measuring current. This means that when a CT measures current below 5% of rated measuring current, its errors, and therefore its contribution to overall accuracy of the Metering System, will not be known. Knowing the CT errors at currents below 5% provides assurance that overall accuracy is more likely to be maintained when CTs operate at low such loads.

Solution

This CP proposes to tighten the minimum accuracy class for Meters in CoP5 from class 2 (or class A) to class 1 (or class B). It also proposes to update the CT accuracy class in CoPs 3, 5 and 10 from class 0.5 to class 0.5S.

Impacts and costs

This CP will have a positive impact on Registrants, Licensed Distribution System Operators (LDSO) and MOAs by further assuring the overall accuracy of Metering Systems and better protect Settlement through knowing CTs are tested to 1% rated measuring currents for CoPs 3, 5 and 10 Metering Systems and Meters in CoP5 will be class 1 (or class B).

The central implementation cost for this CP will be less £2,000 to update the relevant documents.

¹ In accordance with BS EN/IEC 62053-21 for static/electronic Meters or BS EN 62053-11 for electromechanical Meters.

² In accordance with BS EN 50470-3.

³ For whole current Meters, it is between 10% and I_{max} at Unity Power Factor (UPF). For CT operated Meters its between 5% and I_{max} at UPF.

⁴ From 20% to 100% of rated measuring current at UPF.

⁵ A category 2 non-compliance has the potential to impact Settlement.

⁶ In accordance with BS EN/IEC 61869-2.

Implementation

The CP is proposed for implementation on 30 June 2022 as part of the June 2022 Balancing and Settlement Code (BSC) Standard Release.

2 Why Change?

What is the issue?

The metering CoPs detail the standards and minimum accuracy classes⁷ for certain Metering Equipment, i.e. for Meters, CTs and VTs.

The current accuracy class for a Meter in CoP5 makes it difficult for MOAs to assure the overall accuracy of the CoP5 Metering System is within the 1.5% limit specified in the CoPs.

Additionally, CTs in CoPs 3, 5 and 10 have a minimum accuracy class of 0.5, meaning they are required to be tested to a minimum of 5% of rated measuring current. The current minimum class makes it difficult for the errors and overall accuracy of the System to be known when the CT measures current below 5%.

Meter Accuracy Class

Currently, the minimum accuracy class required for a Meter in CoP5 is class 2, in accordance with the British Standards (BS) EN/IEC 62053-21⁸ or class A in accordance with BS EN 50470-3⁹. This means that a class 2.0 (or class A) Meter must have an accuracy within $\pm 2\%$ ¹⁰ when it is manufactured and stamped with the standard and accuracy class. However, the overall accuracy required for a CoP5 Metering System is $\pm 1.5\%$ ¹¹. The current requirements in CoP5 for the accuracy of the Meter makes it difficult for MOAs to assure overall accuracy is met, if they do not or cannot obtain the actual Calibration Certificates for certain items of Metering Equipment, notably CT from LDSOs, detailing the actual errors obtained through testing. The Technical Assurance Agent (TAA) will assume a worst case error of the accuracy class, in the absence of the Calibration Certificates detailing the actual errors. So, for example, the TAA will assume a class 2.0 Meter, with no Calibration Certificate provided, to have a worst case error of $\pm 2\%$. This is before considering the error contributions of any CTs or CTs and VTs, and the evidence of such. Where overall accuracy has not been evidenced as met, the TAA will assign a non-compliance for this.

CT Accuracy Class

Additionally, the minimum accuracy class required for CTs in CoPs 3, 5 and 10 is class 0.5, in accordance with BS EN/IEC 61869-2¹². However, the standard requires class 0.5 CTs to be tested to a minimum of 5% of rated measuring current. This means that when these CTs measure current below 5% of rated measuring current, their errors, and therefore overall accuracy of the Metering System, will not be known. This is particularly the case where the owners of the CTs bulk purchase certain ratios¹³ of CTs which may not be best

⁷ Accuracy class is defined in the Meter standard, BS EN/IEC 62052-11⁷, as 'the category of measuring instruments, all of which are intended to comply with a set of specifications regarding accuracy'.

⁸ 'Electricity metering equipment (a.c.) - Part 21: Static meters for active energy (classes 1 and 2)'

⁹ 'Electricity metering equipment (a.c.) - Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)'

¹⁰ Between 10% of its basic current (for a whole current Meter) or 5% of its nominal current (for a CT operated Meter), and the maximum rated current it can see (at Unity Power Factor).

¹¹ At Unity Power Factor (UPF) between 100% and 20% (inclusive) of rated measuring current. At a Power Factor of 0.5 lag and 0.8 lead it's $\pm 2.5\%$ between 100% and 20% (inclusive) of rated measuring current. At UPF below 20% to 5%, it's $\pm 2.5\%$.

¹² 'Instrument transformers - Part 2: Additional requirements for current transformers'

¹³ The ratio of a CT is the usually expressed as the primary rated current to or over the secondary rated current (in Amperes (A)), e.g. 500/5A. If the primary conductor is carrying 500A the CT will be operating at 100% of rated measuring current and will output more, or less, 5A, depending on its inherent ratio error and phase angle error.

suited to the actual range of current the CTs will see at a site. In other words, the CT may be 'oversized' for the agreed capacity or a Customer may end up reducing their loads so the CTs more regularly run at below 5% of rated measuring current.

Background

The TAA is responsible for completing audits on Metering Systems to confirm compliance with BSC CoP 4 'the calibration, testing and commissioning requirements of metering equipment for settlement purposes'. When a Metering System is found to be non-compliant, the TAA will issue a Category 1 non-compliance where Settlement is being impacted, a Category 2 non-compliance where Settlement may be being impacted or an Observation where Settlement is not being impacted but there is a non-compliance with a requirement (e.g. labels are missing). The TAA issues these non-compliances to industry participants (e.g. Registrants, MOAs, Half Hourly Data Collectors or LDSOs).

The Meter accuracy and CT accuracy class issue was initially discussed by the Technical Assurance of Metering Expert Group ([TAMEG](#)), and has since been considered and progressed by the Issue 93 Work Group at its meetings in June and August 2021.

The Issue 93 group believes that tightening the minimum accuracy class requirements will reduce the number of non-compliances the TAA assigns for the non-provision of Calibration Certificates and overall accuracy not being maintained, and increase the likelihood of CTs errors at the low operating loads being known therefore better protecting Settlement.

Feedback from participants at TAMEG and the Issue 93 Work Group indicate that many participants are already procuring equipment to these tighter tolerances for the reasons already stated. The marginal additional costs of the equipment to these tighter tolerances are reported as minimal.

Proposed solution

This CP proposes to make changes to the CoPs to raise the accuracy class for Meters in CoP5 and change the accuracy class for CTs in CoPs 3, 5 and 10. This document change includes the following:

- Update the requirements for the minimum accuracy class of Meters to class 1/ class B for CoP5.
- Update the requirements for the minimum accuracy class of CTs from 0.5 to 0.5S for CoPs 3, 5 and 10.

Changing the accuracy class for CoP5 Meters will help MOAs to assure overall accuracy of CoP5 low voltage CT Metering Systems is met without necessarily evidencing this with Calibration Certificates. This should result in the TAA assigning fewer category 2 non-compliances for overall accuracy not being maintained.

Additionally, changing the CT accuracy class in CoPs 3, 5 and 10 from class 0.5 to class 0.5S will provide greater assurance that accuracy is being maintained, especially when sites operate at currents below 5% of rated measurement current. This is because class 0.5S CTs will be tested down to 1% of rated measuring current and their error contribution at 1% will be known. The standard for class 0.5S CT also has tighter accuracy requirements at 20% and 5% of rated measuring current than for a class 0.5 CT. e.g.:

Accuracy Class	Ratio Error (%)				
	1% rated current	5% rated current	20% rated current	100% rated current	120% rated current
Class 0.5	-	1.5	0.75	0.5	0.5
Class 0.5S	1.5	0.75	0.5	0.5	0.5

Proposer's rationale

Meter Accuracy Class

Category 2 non-compliances (following a TAA visit) against Metering Systems potentially being outside of the overall accuracy limits have been noted as a significant issue for a number of years.

CoP5 Meters are class 2, which means that their accuracy must be within $\pm 2\%$ ¹⁴. When MOAs calculate overall accuracy for a Metering Systems, if they do not or cannot provide a Meter Calibration Certificate, it becomes difficult for the MOA to assure the Metering System is within $\pm 1.5\%$, the overall accuracy limits for CoP5 Metering Systems. Absence of the Calibration Certificate for a class 2.0 Meter will prompt the TAA to assign a non-compliance for the missing Calibration Certificate and where overall accuracy cannot be demonstrated to be within CoP5 limits.

Tightening the requirements to ensure that all Meters registered against CoP5 are class 1/class B Meters will remove the need for MOAs to present Calibration Certificates for LV CoP5 Metering Systems.

CT Accuracy Class

By mandating that class 0.5S CTs (which have tighter error limits at 20% and 5% and a specified error limit for 1% of rated current) are installed for Metering Systems registered against CoPs 3, 5 and 10, CT errors at low operating loads will be known and overall accuracy of the Metering System more likely to be maintained.

CP Consultation Question

Do you agree with the CP1553 proposed solution?

Please provide your rationale.

We invite you to give your views using the response form in Attachment E

Proposed redlining

The proposed redlining to deliver this CP can be found in Attachments B-D of this paper.

CP Consultation Question

Do you agree that the draft redlining delivers the CP1553 proposed solution?

If 'No', please provide your rationale.

We invite you to give your views using the response form in Attachment E

¹⁴ Between 10% of its basic current (for a whole current Meter) or 5% of its nominal current (for a CT operated Meter), and the maximum rated current it can see (at Unity Power Factor).

4 Impacts and Costs

BSC Party & Party Agent impacts and costs

Participant impacts

BSC Party & Party Agent Impacts	
BSC Party/Party Agent	Impact
Meter Operator Agents	Costs and resources associated with purchasing higher specification Meters when installing new and replacement CoP5 meters.
LDSOs	Marginal additional costs when purchasing new and replacement CTs for CoPs 3, 5 and 10.

Central impacts and costs

Central impacts

The solution in this CP only affects BSC documentation, specifically CoPs 3, 5, and 10. Therefore, no BSC Central Systems will be impacted.

Central Impacts	
Document Impacts	System Impacts
Code of Practice 3 'The Metering of Circuits with a Rated Capacity not Exceeding 10 MVA for Settlement Purposes'	None
Code of Practice 5 'The Metering of Energy Transfers with Max Demand of up to (and including) 1MW for Settlement Purposes'	
Code of Practice 10 'The Metering of Energy via Low Voltage Circuits for Settlement Purposes'	

Central costs

The central implementation costs for CP1553 will be approximately £2,000 to implement the relevant document changes.

CP Consultation Questions

Will CP1553 impact your organisation?

If 'Yes', please provide a description of the impact(s) on your organisation and any activities which you will need to undertake between the approval of CP1553 and the CP1553 Implementation Date (including any necessary changes to your systems, documents and processes). Where applicable, please state which of the roles that you operate as will be impacted and any differences in the impacts between each role.

Will your organisation incur any costs in implementing CP1553?

If 'Yes', please provide details of these costs, how they arise and whether they are one-off or on-going costs.

We invite you to give your views using the response form in Attachment E

5 Implementation Approach

Recommended Implementation Date

This CP is recommended for implementation on 30 June 2022 as part of the standard June 2022 BSC Release.

CP Consultation Question

Do you agree with the proposed implementation approach for CP1553?

Please provide your rationale.

We invite you to give your views using the response form in Attachment E

ISG's initial views

CP1553 was initially presented to the ISG at its meeting on [Tuesday 2 November \(ISG247/07\)](#), with comments from two members.

One ISG member asked if Elexon was aware of the number of 0.5s measurement transformer stock readily available in the market, to which the second member noted as valid question. Elexon noted the comment and highlighted that it would seek feedback on the level of 0.5s stocks as part of the consultation questions.

SVG's initial views

CP1553 was initially presented to the SVG at its meeting on [Tuesday 2 November \(SVG249/04\)](#), with no comments or views from any member.

Appendix 1: Glossary & References

Acronyms

Acronyms used in this document are listed in the table below.

Acronyms	
Acronym	Definition
BS	British Standard
BSC	Balancing and Settlement Code
BSCCo	Balancing and Settlement Code Company
CoP	Code of Practice
CP	Change Proposal
CPC	Change Proposal Circulars
CT	Current Transformer
EN	European Normative Standard
IEC	International Electro-technical Commission
ISG	Imbalance Settlement Group
LV	Low Voltage
MOA	Meter Operator Agent
SVG	Supplier Volume Allocation Group
TAA	Technical Assurance Agent
TAMEG	Technical Assurance of Metering Expert Group
VT	Voltage Transformer

External links

A summary of all hyperlinks used in this document are listed in the table below.

All external documents and URL links listed are correct as of the date of this document.

External Links		
Page(s)	Description	URL
2,3,5,7	Code of Practice 3 'The Metering of Circuits with a Rated Capacity not Exceeding 10 MVA for Settlement Purposes'	https://elexon-bsc-production-cdn.s3.eu-west-2.amazonaws.com/wp-content/uploads/2019/06/28155615/BSC-CoP3-Issue5.pdf
2,3,5,7	Code of Practice 5 'The Metering of Energy Transfers with Max Demand of up to (and including) 1MW for Settlement Purposes'	https://www.elexon.co.uk/documents/bsc-codes/codes-of-practice/code-of-practice-5-the-metering-of-energy-transfers-with-max-demand-of-up-to-and-including-1mw-for-settlement-purposes/

External Links		
Page(s)	Description	URL
2,3,5,7	Code of Practice 10 'The Metering of Energy via Low Voltage Circuits for Settlement Purposes'	https://www.elexon.co.uk/documents/bsc-codes/codes-of-practice/code-of-practice-10-the-metering-of-energy-via-low-voltage-circuits-for-settlement-purposes/
5	Code of Practice 4 'The Calibration, Testing and Commissioning Requirements of Metering Equipment for Settlement Purposes'	https://elexon-bsc-production-cdn.s3.eu-west-2.amazonaws.com/wp-content/uploads/2012/01/28153820/BSC-CoP4-Issue6.pdf
3	TAMEG	https://www.elexon.co.uk/group/technical-assurance-of-metering-expert-group-tameg/
4	British Standards Institution (BSI) Group	https://www.bsigroup.com/en-GB/about-bsi/