

CP Progression Paper

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

ELEXON



Committee

Imbalance Settlement Group (ISG) and Supplier Volume Allocation Group (SVG)



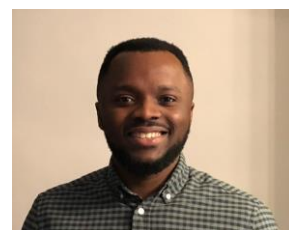
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About This Document

This document provides information on a new Change Proposal (CP) and outlines our proposed progression timetable for this change, including when it will be issued for CP Consultation in the next suitable Change Proposal Circular (CPC) batch.

We are presenting this paper to the ISG on 2 November 2021 and the SVG on 2 November 2021 to capture any comments or questions from Committee Members on this CP before we issue it for consultation.

There are five parts to this document:

- This is the main document. It provides a summary of the solution, impacts, anticipated costs, and proposed implementation approach, as well as our proposed progression approach for this CP.
- Attachment A contains the CP proposal form.
- Attachments B-D contain the proposed redlined changes to deliver the CP solution.

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1 Summary?

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 'Code of Practice for 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 'Code of Practice for 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.



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.

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 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.

British Standards (BS)

British Standards (BS) are the standards produced by the [BSI Group](#) which is incorporated under a [royal charter](#) and which is formally designated as the [national standards body \(NSB\)](#) for the UK.

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.) - Particular requirements - 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 its $\pm 2.5\%$ 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 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.

Background

The TAA is responsible for completing audits on Metering Systems to confirm compliance with BSC [CoP 4 'Code of Practice for 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.



Technical Assurance Agent (TAA)

This is the BSC Agent responsible for Technical Assurance of Central Volume Allocation (CVA) Metering Systems or Supplier Volume Allocation (SVA) Metering Systems.

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.

Proposed redlining

The CP proposes to update CoPs 3, 5 and 10. Please see Attachment B-D for the proposed redlining.

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

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
<ul style="list-style-type: none">• Code of Practice 3 'The Metering of Circuits with a Rated Capacity not Exceeding 10 MVA for Settlement Purposes'• 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'	<ul style="list-style-type: none">• None

Impact on BSC Settlement Risks

Impact on BSC Settlement Risks

Elxon anticipates a minimal positive impact on Risk 007 as the metered data will be more accurate.

Central costs

The central implementation costs for the CP will be less than £2,000 to implement the relevant document changes.

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5 Implementation Approach

Recommended Implementation Date

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

6 Proposed Progression

Progression timetable

The table below outlines the proposed progression plan for the CP:

Progression Timetable	
Event	Date
CP Progression Paper presented to ISG for information	2 Nov 21
CP Progression Paper presented to SVG for information	2 Nov 21
CP Consultation	8 Nov 21 – 3 Dec 21
CP Assessment Report presented to ISG for decision	4 Jan 22
CP Assessment Report presented to SVG for decision	4 Jan 22
Proposed Implementation Date	30 Jun 22 (Jun 22 Release)

CP Consultation questions

In addition to the standard CP Consultation questions for this CP, we intend to ask an additional questions as outlined below.

Standard CP Consultation Questions
Do you agree with the CP proposed solution?
Do you agree that the draft redlining delivers the CP proposed solution?
Will the CP impact your organisation?
Will your organisation incur any costs in implementing the CP?
Do you agree with the proposed implementation approach for this CP?

Additional CP Consultation Questions
Do you currently have existing stock of class 0.5 CTs?
Do you currently have existing stock of class 2 Meters to be used for CoP5 installations?
Do you think the proposed implementation date provides you with enough time to use up the existing class 0.5 CTs?
Do you think the proposed implementation date provides you with enough time to use up the existing class 2 Meters?

7 Recommendations

We invite you to:

- **NOTE** the proposed progression timetable for the CP; and
- **PROVIDE** any comments or additional questions for inclusion in the CP Consultation.
- **NOTE** that the CP will be presented to:
 - the ISG on 2 November 2021; and
 - the SVG on 2 November 2021.

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://elaxon-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.elaxon.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/

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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/
4	Royal Charter	https://www.bsigroup.com/Documents/about-bsi/royal-charter/bsi-royal-charter-and-byelaws.pdf
4	National Standards Body (NSB)	https://www.bsigroup.com/en-GB/about-bsi/uk-national-standards-body/