

**Guideline on recertification of category 1
metering installations by statistical sampling:
The application of clause 16 of Schedule 10.7**

Version 1.0

Version control

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0.1	2 September 2014	Draft for internal review
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Glossary of abbreviations and terms

Authority	Electricity Authority
Code	Electricity Industry Participation Code 2010
Guideline	Guideline on recertification of category 1 metering installations by statistical sampling: the application of clause 16 of Schedule 10.7
MEP	Metering equipment provider
ATH	Approved test house

Contents

Glossary of abbreviations and terms	C
Disclaimer	7
Introduction	7
Summary of the statistical sampling recertification process	8
Stages of the recertification process	9
The part of the Guideline outlines each stage of the statistical sampling recertification process in greater detail.	9
Defining the group	9
Selecting the sample	10
Site procedure	11
Meter testing	12
Final decision	13
Additional information	13

Disclaimer

- a. This guideline (Guideline) outlines how an approved test house (ATH) may recertify a category 1 metering installation under clause 16 of Schedule 10.7 of the Electricity Industry Participation Code 2010 (Code), using a statistical sampling process.
- b. The Guideline is provided to assist participants to understand and comply with the Code. However, it is not a substitute for, nor does it form part of the Code. If there is any inconsistency between the content of the Guideline and the Code, the Code takes precedence.
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- d. Publishing the Guideline does not place any obligation on the Authority to follow any interpretation contained in it when carrying out any of its functions.

Introduction

- e. Clause 16(1) of Schedule 10.7 of the Code provides that a metering equipment provider (MEP) may arrange for an ATH to recertify a group of category 1 metering installations, for which the MEP is responsible, using a statistical sampling process under clause 16(2) of Schedule 10.7.
- f. However, clause 16 of Schedule 10.7 does not provide exhaustive details regarding the statistical sampling process that ATHs must use. This reflects the Authority's intention behind this clause, which was to allow MEPs and ATHs to develop the statistical sampling process to best meet their needs, subject to complying with the requirements of the Code.
- g. The Guideline outlines what is likely to be an acceptable statistical sampling process. The statistical sampling process described in the Guideline is not the only acceptable statistical sampling process, but rather provides an example of what such a process might look like.

Summary of the statistical sampling recertification process

This part of the Guideline summarises the statistical sampling recertification process.

1. To recertify a group of category 1 metering installations using statistical sampling, clause 16(1) of Schedule 10.7 requires an MEP to determine the group of metering installations that require recertification (group).
2. To recertify a group of category 1 metering installations using statistical sampling, clause 16(2)(a) of Schedule 10.7 requires an ATH to select a sample (sample) from the group of category 1 metering installations using a statistical sampling process:
 - (a) prescribed in AS/NZS 1284; or
 - (b) that the Authority has approved and published.
3. The process prescribed in AS/NZS 1284 is for meters, not metering installations. To allow the ATH to correctly apply the statistical sampling process the MEP must pass all metering records for the metering installations in the sample (including the total number of meters, details of the meter types, and the installation environment) to the ATH.
4. The ATH determines the size of the sample using the total number of meters as the “population” for the purpose of Tables 1 and 2 of AS/NZS 1284. The ATH may require a larger than minimum sample size to ensure the sample is representative of the group, and to account for inaccessible installation control points (ICPs) or meters that have been damaged or tampered with.
5. The ATH will then visit every metering installation in the sample and recertify each metering installation using either the selected component or fully calibrated certification methods under clauses 11(3) and 13(3) of Schedule 10.7 of the Code.
6. The ATH then returns metering records for the recertified metering installations to the MEP¹ so that the MEP can update the registry metering records within the relevant timeframes under Part 11 of the Code.
7. If the ATH used the selected component method of certification, the ATH then transfers the meters taken from the metering installations to an approved test laboratory for calibration using either the ‘testing by attributes’ or the ‘testing by variables method’ described in AS/NZS 1284.
8. The ATH then assesses the calibration results against the pass/fail criteria in AS/NZS 1284.
9. If the sample fails under a ‘testing by attributes’ method, the ATH must decide whether to fail the group, or retest using the ‘testing by variables method’.
10. Once the ATH has tested the meters, it then advises the MEP:

¹ Clause 14 of Schedule 10.4 of the Code.

- (a) as to whether the group passes or fails
 - (b) if the group has passed, the certification validity period.
11. The MEP then updates the registry metering records for all the metering installations in the group, using the date of the ATH advice regarding the certification date (for a group that passes) or certification expiry (for a group that fails).
 12. The ATH advises the MEP of any non-meter failures for the metering installations that were recertified, including failures relating to wiring, configuration, data, or load control device issues.
 13. The MEP analyses the non-meter failures and determines if they present statistically significant issues. If such issues are present, the MEP implements a repair programme for the metering installations in the Group to repair these issues.
 14. To provide for audits required under the Code, the ATH must document all steps, processes, assumptions and decisions made in the recertification process, and keep records of each step in the process, each metering installation in the sample, and each metering installation in the group that is recertified using the statistical sampling process.

Stages of the recertification process

The part of the Guideline outlines each stage of the statistical sampling recertification process in greater detail.

Defining the group

15. The MEP is responsible for defining the group (of category 1 metering installations) that will be recertified using the statistical sampling process.
16. The group may be as large or as small as the MEP decides. There are risks and benefits that arise depending on the size of the group. Issues that the MEP should consider in making this decision include:
 - (a) the likelihood of the different types and different ages of meters passing accuracy tolerances
 - (b) the size of the sample needed to ensure it is representative
 - (c) the number of groups that will be required to cover the full number of metering installations requiring recertification
 - (d) the cost of certifying the metering installations in the group if the sample fails.
17. In defining the group, the MEP must only select metering installations recorded in the registry, not ICPs or individual meters.

Selecting the sample

18. The ATH is responsible for selecting the sample, testing the meters and determining whether the group passes or fails the recertification process based on the meter calibration results.
19. An ATH or MEP may propose a statistical sampling process that differs from AS/NZS 1284 that the Authority may approve. If the Authority approves the proposed statistical sampling process, it will then publish this process, and any ATH may use the process as an alternative to AS/NZS 1284. As at 1 September 2014, the Authority has not approved any alternative to AS/NZS 1284.
20. AS/NZS 1284 is a standard for testing meters (not metering installations), so the ATH will need to procure a list of meters that are contained in the metering installations in the group. The population for the purposes of applying AS/NZS 1284 is the number of meters in the group.
21. The ATH must decide whether to use the 'testing by attributes' method or the 'testing by variables' method (as described in AS/NZS 1284) for testing the meters.
22. The ATH will then determine the minimum sample size from table 1 (for testing by attributes) or table 2 (for testing by variables) of AS/NZS 1284. The ATH will need to increase the minimum sample size to account for the likely number of inaccessible metering installations and meters that have been damaged or tampered with.
23. The ATH will need to have a process to randomly select the required number of samples from the list of meters. This process must ensure that each meter in the group has the same probability of selection, and that the selection method is completely random.
24. If this process uses a software formula, such as a random number generator, then the process must also include steps to capture the value or output of the formula as it is assigned to each meter. This is because whenever the process is rerun (or the software is restarted), the formula will recalculate and produce a different result making the original selection un-auditable.
25. Once the ATH has selected the meter sample, it must assess the meter sample to ensure it is representative of the group. Factors that the ATH should take into account to decide whether the meter sample represents the group include, but are not limited to:
 - (e) meter construction principles
 - (f) meter manufacturer
 - (g) the ATH's experience of the accuracy of meter make and model
 - (h) the range of environments in which the meters are installed.
26. As the integrity of the statistical sampling process depends on the meter sample being representative of the group, the ATH must satisfy itself that the meter sample properly represents the group. The ATH should keep auditable records to document the factors it considers in forming this view.

27. Depending on the make-up of the group, the ATH may require more than the minimum sample size to ensure the meter sample is representative of the group. The ATH and MEP should discuss the final sample size, and as necessary, refine or split the group.
28. The ATH should also include a process for selecting additional meter samples if there is a higher than expected number of inaccessible metering installations or meters that have been damaged or tampered with. This process should maintain the statistical integrity of the overall procedure. The ATH can do this by randomly ordering the entire group before selecting the original sample, and documenting this order in a list so it can be used for selecting additional meter samples. If additional samples are required, the ATH can then select the next 10 (or other amount as determined by the ATH) in the list. This will ensure every metering installation in the original group has the same probability of being selected and the selection is random.
29. Once the ATH has selected the final meter sample, it needs to identify and advise the MEP of the metering installations that contain the selected meters. The MEP is likely to have contractual obligations with the traders at these ICPs around advising the customers, or other requirements that it must provide for, before the ATH can visit the MEP's site.
30. To ensure the statistical integrity of the sampling process, the ATH must document the entire process before any part of the sampling process commences. If this does not occur, then any change part way through the process is likely to invalidate the process's statistical integrity and require the ATH to restart the statistical sampling process.

Site procedure

31. Where a selected metering installation is part of an ICP that has multiple metering installations, the MEP may request that the ATH recertify the other metering installations at the ICP while the field technician is on site. If this is the case, the ATH must not include the additional meters in the meter sample, and any faults found in the additional metering installation(s), should instead be separately reported to the MEP.
32. If the MEP wants to certify all the load control devices in the group, then all the load control devices in the selected metering installations must be component certified (in accordance with clause 4 of Schedule 10.8) and included in the metering installation certification as part of the site visit.
33. The ATH must visit and recertify every metering installation in the selected sample using either the selected component method or the fully calibrated method set out in the Code.² The ATH must recertify all of the components (including meters and load control devices if required by the MEP) in each metering installation that is part of the sample, and identify each meter that it has removed or calibrated:
 - (a) as being part of the meter sample; or
 - (b) as not being part of the meter sample.

Only meters that are identified as being part of the meter sample are to be included in the assessment under AS/NZS 1284.

² Clauses 11 and 13 of Schedule 10.7.

For clarity, if using the selected component method, the ATH must replace all of the meters in the metering installation that is being recertified. If using the fully calibrated method, the ATH must calibrate all of the meters in the metering installation that is being recertified

34. If it appears that a metering installation from the sample is inaccessible, the ATH must document the reasons for this. The ATH must use its best endeavours to gain access to the metering installation, including making several attempts to contact the customer (by different means and at different times), to arrange safe access.
35. Load control devices do not need to be replaced, but if required by the MEP, they must be certified as components in accordance with clause 4 of Schedule 10.8. It is recommended that a test laboratory tests load control devices to develop a history of the fitness for purpose of load control device make/models.
36. The ATH must document any faults, inaccuracies or errors it discovers with the existing metering installation. This includes damage to the meter or relay, wiring issues, termination issues, configuration errors and data errors, or other issues that mean the metering installation cannot be certified without correction.
37. If the ATH finds any evidence that a meter has been tampered with (whether or not it is part of the meter sample), it should refer such evidence to the MEP before commencing work. This is because the MEP may elect to carry out further investigation before the ATH proceeds with the recertification process.
38. If a meter is damaged or has been tampered with, the ATH may exclude it from the meter sample.
39. If the ATH uses the selected component certification method, it must transfer all meters to an approved test laboratory or an approved calibration laboratory for testing. It is recommended that the load control devices are tested.
40. The ATH must fully certify each metering installation in the sample, follow all the requirements of the certification method used, and ensure that it determines an appropriate certification expiry date.
41. The ATH must then send the certification records for the recertified metering installations to the MEP. The MEP must then update the registry metering records within the timeframes prescribed in the Code.
42. If the MEP wants to certify the load control devices in the entire group, it must do so for all of the load control devices in the sample.

Meter testing

43. The approved test laboratory must test all the meters in the metering installations in the sample. However, the approved test laboratory should only include the results of a meter selected in the meter sample for assessment against the pass/fail criteria of AS/NZS 1284.
44. The ATH must separately report any failures of the meters not selected in the meter sample to the MEP.

45. The ATH must assess the results of the meter tests against the pass/fail criteria under Table 5 of AS/NZS1284. Examples of this process are contained in Appendix B of AS/NZS1284.
46. If the sample fails, the ATH must make a decision on the next steps, choosing from the four available options under section 8.7.2 of AS/NZS1284. If the ATH thinks that splitting the population is a preferable course of action, then the ATH needs to involve the MEP in making this decision. This is because:
 - (a) under clause 16(1) of Schedule 10.7 the MEP defines the groups
 - (b) there are likely to be additional costs and time required if additional samples are needed.
47. Once the ATH has exhausted all available options, it must make a final decision on whether the sample has passed or failed. If the sample passes, the ATH must then determine the certification validity period in accordance with Table 5 of AS/NZS 1284.
48. The ATH must collate the test results from any additional meters found in the metering installation that were not part of the selected meter sample, and add these results to the additional information to be passed on to the MEP.

Final decision

49. The ATH must formally advise the MEP of the final decision on the recertification as soon as it is made.
50. The ATH needs to keep certification records for all metering installations in the group. This is likely to be a very simple record of ICP, metering installation identifier, component details as currently recorded on the registry, a reference to the statistical sampling programme records and the certification dates.
51. If the group passes, the MEP must update the registry with the certification date, certification expiry date, and any other required information for each metering installation in the group. The certification date is the date that the ATH advises the MEP that the group has passed.
52. If the group fails, the MEP must update the registry with the expiry date for each metering installation in the group. The expiry date is the date the ATH advised the MEP that the group failed. In this event, the MEP will need to initiate recertification plans for all metering installations in the group as soon as possible.
53. The registry update should also include whether or not the load control device in each metering installation is certified. See paragraph 32.

Additional information

54. During the recertification process, the ATH must provide the MEP with any additional information about:
 - (a) faults, inaccuracies or errors discovered with existing metering installations
 - (b) additional meter calibration information gathered from non-selected meters that were removed and tested by the approved test laboratory,

(c) load control device tests.

55. If the ATH notices any trends or systemic issues in this additional information, it should also identify these to the MEP.
56. The MEP must analyse this additional information, looking for statistically significant trends that indicate similar issues are likely to be present in the metering installations in the group.
57. If the MEP identifies such trends, it must carry out all necessary repairs on all affected metering installations.