This Registry Procedure is incorporated by reference into the Batteries Regulation made under the *Resource Recovery and Circular Economy Act, 2016*.

Section 1, Battery Supply Data Verification, establishes how producers:

- determine battery supply data;
- verify battery supply data; and
- verify the weight of post-consumer recycled content of batteries.

Section 2, Battery Management Performance, establishes how:

- battery processors will calculate and verify the Recycling Efficiency Rate (RER) of their processing facilities; and
- producers, or producer responsibility organizations (PROs) on their behalf, will conduct third-party audits verifying the resources recovered from the management of batteries used and collected in Ontario.

It is the intention of the Registrar to review this procedure in 2020, in a public consultation process with registrants and other interested parties.

Section 1 – Battery Supply Data Verification

Determining Supply Data

The Batteries Regulation requires producers to submit to the Authority the weight of the batteries they supply into Ontario for the purpose of determining the producer's management requirement. This weight must exclude the weight of any packaging that may be supplied with the batteries.

To determine the weight of batteries supplied into Ontario, the producer may need to determine how many battery units are supplied into Ontario.

a) Determining the number of battery units

For supply data provided in 2020 and 2021, battery producers may choose one of the following methodologies to determine the number of units supplied into Ontario:

1. The actual number of battery units.

2. The number of battery units calculated using the formula set out in Appendix A to determine the Ontario portion of the battery units supplied into Canada.

The options described above do not reduce the obligation of a producer to provide accurate supply data or limit the ability of an Authority inspector to review the data and related records for the purpose of determining compliance.

b) Determining battery weight

For supply data provided in 2020 and 2021, battery producers may choose one of the following methodologies to report the weight of the batteries they supply into the Ontario market:

1. The actual weight of the batteries.

2. The weight of batteries calculated using the unit to weight conversion calculators provided by the Registrar. See Appendix B for the unit to weight conversion for single-use and rechargeable batteries.

The options described above do not reduce the obligation of a producer to provide accurate supply data or limit the ability of an Authority inspector to review the data and related records for the purpose of determining compliance.

Verification of Battery Supply Data

The Batteries Regulation requires battery producers to verify the supply data they submit to the Authority, in accordance with this procedure.

Verification of the supply data provided in 2020 and 2021 is not required. This does not reduce the obligation of a producer to provide accurate supply data or limit the ability of an Authority inspector to review the data and related records for the purpose of determining compliance.

Beginning in 2022, verification will be required for supply data. The verification must include an opinion on the accuracy of the supply data and the qualifications of the verifier to provide the opinion. The verifier must:

- Assess and document the reasonableness of the producer's methodology for determining the battery supply; and
- Obtain and review supporting evidence as required.

It is the intention of the Registrar to develop more detailed verification procedures, in a public consultation process with registrants and other interested parties.

Reduction of Management Requirement

Producers who supply batteries containing post-consumer recycled content, i.e., content that was recovered from products or packaging that were used by consumers, may reduce the supply weight used to derive their management requirement by the weight of that recycled content in each year the recycled content was used. This reduction is limited to a maximum reduction of 50% and applies only to the battery category that contains the recycled content.

Verification of the weight of post-consumer recycled content provided in 2020 and 2021 is not required. This does not reduce the obligation of a producer to provide accurate data or limit the ability of an Authority inspector to review the data and related records for the purpose of determining compliance.

Beginning in 2022, verification will be required for the weight of post-consumer recycled content. To do so, a producer must submit the following, on or before the supply data reporting deadline:

a. the weight of the recycled content in the batteries for which supply data is being provided;
b. the category and type of battery; and

c. third party verification of the recycled content claim.

Third party verification may be done by Underwriters Laboratories of Canada (ULC), Intertek, or another third party proposed by a producer that is qualified to provide such verification.

Section 2 – Battery Management Performance

Definitions and Background

A “battery processor”, as defined in the Batteries Regulation, means a person who processes, for the purpose of resource recovery, batteries used by a consumer in Ontario.

For the purposes of this procedure, a downstream processor is a person that receives materials derived from batteries used and collected in Ontario. The materials are provided by a battery processor to a downstream processor for the purpose of further processing. A downstream processor is not a battery processor for the materials it receives from the upstream processing of batteries.

For the purposes of this procedure, recovered resources that can be used to satisfy the management requirements under the Batteries Regulation include:

- materials used or destined to be used by a person for the making of new products or packaging;
- materials used to enrich soil;
- materials used as aggregate; and
- batteries that are reused or refurbished.

The weight of the recovered resources must only count once, must not be counted by more than one producer, and the following cannot be used to satisfy the management requirements under the Batteries Regulation:

- materials derived from batteries that were not used and collected in Ontario;
- materials that are land disposed;
- materials that are incinerated;
- materials that are used as fuel or a fuel supplement; and
- materials that are stored, stockpiled, used as a daily landfill cover or otherwise deposited on land.

Resource recovery includes the recovery of resources from:

- batteries; and
- materials derived from the batteries by a battery processor and sent to a downstream processor for resource recovery.

“Recycling efficiency rate” (RER), as defined in the Batteries Regulation, means the ratio of the weight of resources recovered from batteries received by a battery processor, to the weight of batteries received by that battery processor.

“Primary battery”, as defined in the Batteries Regulation, means a battery that can be used only once (i.e., a single-use battery).

“Rechargeable battery” means a battery that can be recharged to be used more than once.

Calculation and Verification of RER

Every battery processor is required to determine the RER, which must be reported to the Authority.

a) Calculation of RER

The RER for a calendar year is calculated for single-use batteries and rechargeable batteries as follows:

$$(R / TW) \times 100\%$$

Where:

"R" is the weight of the recovered resources derived from all batteries received by the processor in a calendar year and shall not include more than 15% in the form of aggregate.

"TW" is the total weight of all batteries received by the processor in the same calendar year.

If the processor's facility processes both single-use and rechargeable batteries, the RER must be calculated separately for single-use and rechargeable batteries.

If batteries are received by a battery processor and transferred as intact or unprocessed batteries to another entity for processing, those batteries are not to be included in the calculation of the RER by the battery processor transferring the batteries. Instead, those batteries are to be included in the calculation of the RER of the battery processor receiving and processing those batteries.

If batteries are received by a battery processor and transferred as intact or unprocessed batteries to another entity for refurbishment, those batteries are not to be included in the calculation of the RER by the battery processor transferring the batteries.

b) Downstream processing

A battery processor must include the resources recovered from a downstream processor in its RER.

As an example, Processor A receives 100 tonnes of batteries. Processor A separates the components of the batteries with the following results:

- 70 tonnes of metal (to be sent to a smelter)
- 8 tonnes of chemicals (to be sent to a battery manufacturer)
- 22 tonnes of plastic (to be sent to a plastic recycler)

The smelter is not a downstream processor.
All 70 tonnes sent to the smelter count as recovered resources. Processor A has recovered 70 tonnes that can count as recovered resources in the RER formula above. Note, should the smelter receive whole batteries, rather than metal recovered from batteries, the smelter is a battery processor and not a downstream processor, as it is receiving batteries for the purpose of resource recovery.

The battery manufacturer is not a downstream processor.
All 8 tonnes of the chemicals sent to the battery manufacturer count as recovered resources. Processor A has recovered 8 tonnes that can count as recovered resources in the RER formula above.

The plastic recycler is a downstream processor.
Assuming the plastic recycler's verified efficiency is 50%, 11 of the 22 tonnes sent from processor A is destined to be used to make new products or packaging. Therefore, processor A can count those 11 tonnes as recovered resources in the RER formula above.

In total 89 tonnes of resources were recovered from the initial 100 tonnes of batteries. Therefore, Processor A can report an RER of 89%.

c) RER requirements and timing considerations

For the 2020-2021 and 2022 performance periods, producers who choose to meet their resource recovery obligation using the services of a battery processor, directly or through a PRO, may use any battery processor that is:

(a) registered with the Authority; or
(b) not required to register with the Authority because it processed less than 300 tonnes of batteries for the purpose of fulfilling producer responsibilities in the previous calendar year.

The Batteries Regulation requires that, beginning in 2023, all battery processors, including a battery processor that may not be required to register and report, must have an average RER, calculated and verified in accordance with this procedure, of at least:

- 80%, for single-use batteries weighing 5kg or less, and
- 70%, for rechargeable batteries weighing 5kg or less.

Under the Batteries Regulation, a registered battery processor's first report must be submitted to the Registrar no later than April 30, 2022. In this first report, the battery processor must include a verified RER for the 2021 calendar year.

The list of battery processors that meet the RER thresholds, based on this first report, will be published on the Registry and communicated to registered producers and PROs by June 30, 2022, as noted in the chart below:

Annual report	Year reported on	Approved processor list published	Processor approval period
April 30, 2022	2021	June 30, 2022	2023 to 2025

For the 2023 to 2025 performance periods, producers, and PROs on behalf of producers, who are meeting battery management obligations using recovered resources from battery processing, may only do so with a battery processor that meets the RER calculation and verification requirements described in this procedure, and that is either:

(a) on this list; or

(b) not required to register with the Authority because it processed less than 300 tonnes of batteries for the purpose of fulfilling producer responsibilities in the previous calendar year.

This list will be updated to reflect new market entrants.

If a battery processor did not process batteries prior to 2022, the battery processor must contact the Registrar, by email to registry@rpra.ca, to confirm the appropriate RER data to be used in place of 2021 RER data.

Following the April 30, 2022 report, battery processors that processed 300 tonnes or more of batteries for the purpose of fulfilling producer responsibilities in the previous calendar year must submit an annual report no later than April 30 every year, which must include a verified RER for the previous calendar year.

The verified RERs will be averaged by the Registrar every three years and an updated list of battery processors that meet the RER requirements, based on this average, will be published on the Registry and communicated to registered producers and PROs by June 30 of every third year, as noted in the chart below:

Annual report	Years reported on	Approved processor list published	Processor approval period
April 30, 2023 April 30, 2024 April 30, 2025	2022 to 2024 (three-year average RER)	June 30, 2025	2026 to 2028
April 30, 2026 April 30, 2027 April 30, 2028	2025 to 2027 (three-year average RER)	June 30, 2028	2029 to 2031
And so on			

For each three-year period, producers, and PROs on behalf of producers, who are meeting battery management obligations using recovered resources from battery processing, may only do so with a battery processor that meets the RER calculation and verification requirements set out in this procedure, and is either:

(a) on the list for that period; or
(b) not required to register with the Authority because it processed less than 300 tonnes of batteries for the purpose of fulfilling producer responsibilities in the previous calendar year.

The list will be updated to reflect new market entrants.

If a battery processor is a new entrant at any time after 2022, the battery processor must contact the Registrar, by email to registry@rpra.ca, to confirm the appropriate RER data to be used to establish the battery processor's average RER.

d) Verification of RER

The RER must be verified by a licensed engineering practitioner who holds a licence, limited licence or temporary licence under the Professional Engineers Act. The verifier must prepare a verification report which must include:

- a description of the methodology used by the verifier;
- the information reviewed by the verifier; and
- the results of the verification.

The battery processor must submit the verification report on or before April 30 of each reporting year as part of their annual report.

In 2020, it is the intention of the Registrar to develop more detailed verification procedures, in a public consultation process with registrants and other interested parties.

Management of Batteries

Where the Batteries Regulation requires a producer to audit the practices and procedures implemented to comply with the management requirements in the applicable years, the audit must be carried out by an independent auditor. The audit report prepared by the auditor must include an opinion on the accuracy of the reported data.

Where a producer has retained the services of a PRO, the PRO can arrange for the independent auditor to undertake the audit report on the producer's behalf. Where that PRO has more than one producer client, a single audit report may be submitted on behalf of all their producer clients.

In reaching an opinion, the auditor is expected to:

- Assess and document the reasonableness of the battery producer's methodology, or the PRO's methodology where a producer has retained a PRO, to develop the data that is required to be prepared and submitted to the Authority;
- Obtain and review supporting evidence, as required.

The first audit report is due April 30, 2024 for the performance periods January 1, 2022 to December 31, 2023. In 2020, it is the intention of the Registrar to develop more detailed verification procedures, in a public consultation process with registrants and other interested parties.

	Revisions	Next review
Issued January 24, 2020	N/A	
Reviewed August 2020	Added Rechargeable Batteries Weight Conversion tables and edits for consistency	2021
Reviewed February 2021	Fixed clerical error in Rechargeable Weight Conversion Factors by Chemistry and Size table. Lead acid 4V, 6V and 12V batteries weights were in grams rather than kilograms.	2021

Appendix A

The estimated amount of batteries supplied into Ontario can be determined by using the formula,

(P1/P2) x Canada National Sales

“P1” is the population of Ontario, as reported by Statistics Canada in the most recent official census,

“P2” is the total population of provinces and territories in Canada in which the producer sells batteries in, as reported by Statistics Canada in the most recent official census.

“Canada national sales” is the total units of batteries producer sold in Canada in the calendar year.

Appendix B –Batteries Weight Conversion Factors

Single-Use Batteries Weight Conversion Factor by Chemistry and Size

Battery Types by Material	Weight (kg)
Alkaline Manganese - Button Cell	0.0015
Zinc-air - Button Cell	0.0026
Silver Oxide - Button Cell	0.0023
Lithium - Button Cell	0.0026
Lithium - AA	0.0145
Lithium - AAA	0.0076
Lithium - Primary	0.0100
Zinc-carbon - 6V oblong lantern	1.2700
Zinc carbon - 6V square lantern	0.6000
Zinc carbon - 9V	0.0375
Zinc carbon - D	0.0945
Zinc carbon - C	0.0483
Zinc carbon - AA	0.0170
Zinc-carbon - AAA	0.0097
Alkaline Manganese - AAA	0.0112
Alkaline Manganese - AA	0.0234
Alkaline Manganese - C	0.0689
Alkaline Manganese - D	0.1445
Alkaline Manganese - 9V	0.0455
Alkaline Manganese - 6 V square lantern	0.7485
Alkaline Manganese - 6V oblong lantern	1.5855

Rechargeable Weight Conversion Factors by Chemistry and Size

Size	Chemistry	Weight (kg)
4 V	Lead acid	1.330
6 V	Lead acid	1.626
9 V	Nickel-Cadmium	0.035
	Nickel-Metal Hydride	0.042
12 V	Lead acid	2.043
N	Nickel-Cadmium	0.010
	Nickel-Metal Hydride	0.011
AAA	Nickel-Cadmium	0.0105
	Nickel-Metal Hydride	0.013
	Other	0.011
AA	Nickel-Cadmium	0.0215
	Nickel-Metal	0.0271

		Hydride	
		Other	0.022
A		Nickel-Cadmium	0.032
		Nickel-Metal Hydride	0.040
C		Nickel-Cadmium	0.073
		Nickel-Metal Hydride	0.080
		Other	0.058
Sub C		Nickel-Cadmium	0.0529
		Nickel-Metal Hydride	0.055
D		Nickel-Cadmium	0.145
		Nickel-Metal Hydride	0.1628
		Other	0.104
F		Nickel-Cadmium	0.231
		Nickel-Metal Hydride	0.2613
Pin cell		Lithium-ion	0.001
Button cell		Lithium-ion	0.0025
Prismatic single cell		Lithium-ion	0.0217
Cylindrical single cell		Lithium-ion	0.0418
Pouch cell	55-500 typical nominal mAh	Lithium-ion	0.0052
	501-1000 typical nominal mAh	Lithium-ion	0.0158
	1001-2000 typical nominal mAh	Lithium-ion	0.030
	2001-5000 typical nominal mAh	Lithium-ion	0.055
	>5001 typical nominal mAh	Lithium-ion	0.112

Rechargeable Weight Conversion Factors by Application

Application	Chemistry	Weight (kg)
Cell phones E.g. cellular phones, smartphones	Lithium Cobalt Oxide (LCO)	0.028
	Lithium Nickel Manganese Cobalt Oxide (NMC)	0.053
Cameras/games E.g. video game controller	Lithium-ion (Includes: Lithium Cobalt Oxide, Lithium Nickel Manganese Cobalt Oxide, Lithium Manganese Oxide)	0.215
Others portable E.g. power banks, shavers, toothbrushes, drones, cordless mice, remote	Nickel-Metal Hydride (NiMH)	0.042
	Lithium-Ion (Includes: Lithium Nickel Manganese Cobalt Oxide, Lithium Manganese Oxide, Lithium Iron Phosphate)	0.215

controls, MP3, cordless landline phones	Lead acid (PbA)	0.806
Tablets	Lithium-ion (Includes: Lithium Cobalt Oxide, Lithium Nickel Manganese Cobalt Oxide)	0.246
Laptops/Portable PC	Lithium Cobalt Oxide (LCO)	0.341
	Lithium Nickel Manganese Cobalt Oxide (NMC)	0.438
Cordless tools E.g. gardening tools, cordless tools, power tools	Lithium Nickel Manganese Cobalt Oxide (NMC)	0.495
	Nickel-Metal Hydride (NiMH)	0.923
	Nickel-Cadmium (NiCd)	1.182
	Lead acid (PbA)	1.556
E-bikes	Lithium Ion (Includes: Lithium Nickel Manganese Cobalt Oxide, Lithium Manganese Oxide, Lithium Cobalt Oxide, Lithium Iron Phosphate)	2.802
Industrial excluding mobility E.g. pallet lifters, forklifts, energy storage for industrial use, other non-portable	Any Nickel (Includes Nickel-Cadmium Nickel-Metal Hydride)	2.963
	Lithium-ion (Includes Lithium Manganese Oxide, Lithium Cobalt Oxide, Lithium Nickel Manganese Cobalt Oxide, Lithium Nickel Cobalt Aluminium Oxide, Lithium Iron Phosphate)	2.984
Lighting E.g. security lighting, shielded or full cut-off lamps, control and power lines	Nickel-Cadmium (NiCd)	2.963
Medical E.g. measuring instruments, medical carts and beds, portable defibrillators	Lithium Cobalt Oxide (LCO)	2.984
Uninterruptible Power Supply (UPS)	Lithium Iron Phosphate (LFP)	2.984
Telecom	Lithium Nickel Manganese Cobalt Oxide (NMC)	2.984
Personal Mobility Devices/ Light Electric Vehicles E.g. golf carts, mobility scooters	Lithium Nickel Manganese Cobalt Oxide (NMC)	3.284
Off-Grid Energy Storage Eg. solar/wind energy systems, RV/boat energy storage	Lithium Iron Phosphate (LFP)	2.984