

Mechanism for Generation of EPR Certificates

Background

As per Battery Waste Management Rules, 2022, Producer have the obligation of Extended Producer Responsibility for the Battery that they introduce in the market. Extended Producer Responsibility target given in Schedule II of the Rules for the Producer will be specific to the kind of Battery (viz. Lead acid, Li-Ion, Nickel Cadmium, Zinc based Battery, etc.) within each type of Battery- portable, automotive, industrial and electric vehicle Battery. Producer will meet their Extended Producer Responsibility obligation through the Extended Producer Responsibility certificate made available by recycler.

The certificate for Waste Battery provided by registered Recyclers shall be provided for the type and quantity of Battery recycled and can be transacted for meeting Extended Producer Responsibility obligations.

Extended Producer Responsibility certificates for recyclers and refurbishers shall be generated based on the weight of Waste Batteries processed and weight of key battery material produced as per the formula given below:

Extended Producer Responsibility certificates (in kg) = Weight of the identified key battery metal(s) produced and sold from recycling of Waste Battery (in kg)

- **Key Battery Material in different kind of batteries**

S. No.	Kind of Battery	Key Metals
1.	Lead Acid	Lead (Pb)
2.	Lithium Ion	Lithium (Li), Nickel (Ni), Manganese (Mn), Cobalt (Co), Aluminium (Al), Iron (Fe), and Copper (Cu)
3.	Zinc - based	Zinc (Zn), Manganese (Mn), and Iron (Fe)
4.	Nickel – Cadmium (Ni-Cd)	Nickel (Ni), Cadmium (Cd), and Iron (Fe)
5.	Others – Nickel Metal Hydride (NiMH)	Nickel (Ni), Iron (Fe)

- **Composition of metals in different Kind of Battery (in %)**

Kind of Battery	Percentage of Metals									
	Lead (Pb)	Li	Mn	Zn	Ni	Co	Cd	Al	Fe	Cu
Lead Acid	60-80	0	0	0	0	0	0	< 3	< 3	< 3
Lithium Ion	0	1 - 5	0-15	< 1	0 - 15	0 – 20	0	5 - 25	1 - 46	2 – 18
Zinc based	0	0	15 - 30	12 - 40	0	0	0	0 - 20	15 – 40	< 2
Nickel - Cadmium	0	0	0	0	18 - 30	0	10 -20	< 2	25 - 35	< 2

- **Bifurcation of key battery metals in different types of Lithium-Ion Batteries**

Different Types of Li-Ion Batteries	Percentage of Metals									
	Lead (Pb)	Li	Mn	Zn	Ni	Co	Cd	Al	Fe	Cu
Nickel Cobalt Aluminium (NCA)	0	1-2	0	0	10-15	2-5	0	20-25	< 1	10 - 15
Lithium Manganese Oxide (LMO)	0	1 - 2	10 - 15	0	0	0	0	20 - 25	< 1	10–15
Nickel Manganese Cobalt (NMC)	0	1-2	4-8	0	12-16	8-12	0	20 - 25	5 - 10	12-18
Lithium Cobalt Oxide (LCO)	0	2 - 4	0	0	1 - 2	15 - 20	0	4 - 8	15 - 20	5 – 10
Lithium Iron Phosphate (LFP)	0	1 - 2	0	0	0	0	0	5 - 10	40 - 45	5 - 10

EPR Certificate Generation Mechanism (Sample Calculations)

(i) Sales data for different types and kind of battery by the Producer

S. No.	Battery Type	Battery Composition	Sales Year/Import Year	Target Year	Quantity Sold / Imported (in kg)	Target Quantity as per Rules (in kg)
1.	Portable battery used in consumer electronics which are rechargeable	Lithium Ion	2017-18	2022-23	1000	500
2.	Automotive Battery	Lead Acid	2019-20	2022-23	1000	400

(ii) Key Battery metals – Composition of Kind of Battery provided by the Producer while registering and filing returns

Battery Kind	Lithium (Li)	Nickel (Ni)	Manganese (Mn)	Cobalt (Co)	Aluminium (Al)	Iron (Fe)	Lead (Pb)	Copper (Cu)
Lithium Ion (P)	5%	10%	10%	20%	10%	20%	0	0
Lead Acid (I)	0	0	0	0	0	0	65%	0

Where, P = Portable battery used in consumer electronics which are rechargeable;

I = Industrial battery

Check: Range of battery metals in different type and chemistries of battery is defined as above and accordingly check will be added so that Producer shall not be able to fill absurd percentages of battery material

(iii) EPR Obligations for Producers

- a. Target of each type of battery will be fulfilled when the EPR Certificates (in kg) of all key battery metals corresponding to the type of battery will be procured by the Producers from recycler/s and the certificates will be submitted to CPCB through Online EPR Portal as Annual Returns. EPR obligations will be calculated considering recovery efficiency in recovering the key battery metals.

- EPR Certificates of Lithium to be procured for Lithium Ion battery (P) = Percentage of Lithium present in this battery type x Target Quantity (in kg) of this battery type (as defined in rules) x **conversion factor**
 $= 5\% \times 500 \times 0.75 = 18.75 \text{ kg}$
- EPR Certificates of Nickel to be procured for Lithium Ion battery (P) = Percentage of Nickel present in this battery type x Target Quantity (in kg) of this battery type x conversion factor
 $= 10\% \times 500 \times 0.9 = 45 \text{ kg}$
- EPR Certificates of Manganese to be procured for Lithium Ion battery (P) = Percentage of Manganese present in this battery type x Target Quantity (in kg) of this battery type x conversion factor
 $= 10\% \times 500 \times 0.9 = 45 \text{ kg}$
- EPR Certificates of Cobalt to be procured for Lithium Ion battery (P) = Percentage of Cobalt present in this battery type x Target Quantity (in kg) of this battery type x conversion factor

= 20% x 500 x 0.9 = 90 kg

- EPR Certificates of Aluminium to be procured for Lithium Ion battery (P) = Percentage of Aluminium present in this battery type x Target Quantity (in kg) of this battery type x conversion factor

= 10% x 500 x 0.9 = 45 kg

- EPR Certificates of Iron to be procured for Lithium Ion battery (P) = Percentage of Iron present in this battery type x Target Quantity (in kg) of this battery type x conversion factor

= 20% x 500 x 0.9 = 90 kg

Important: Conversion Factor = Quantity of recoverable metal from processing of 1 kg of battery. Conversion Factor may be considered as 0.9 for 2 years' and may be revised from time to time. (To be discussed)

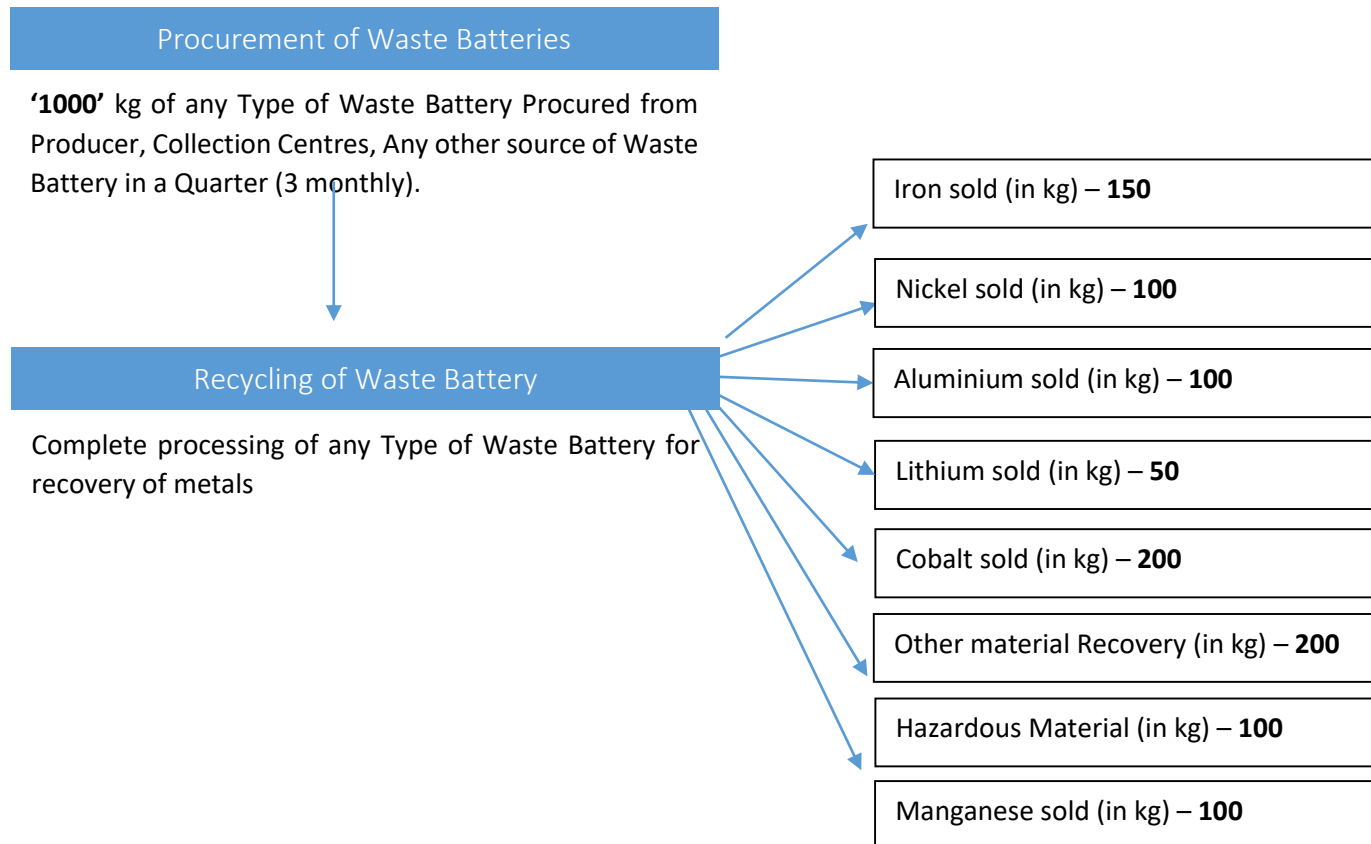
b. Certificates of available metals to be exchanged between Producer and Recycler (s)

Battery Kind	Lithium (Li)	Nickel (Ni)	Manganese (Mn)	Cobalt (Co)	Aluminium (Al)	Iron (Fe)	Lead (Pb)	Copper (Cu)
Lithium Ion (P)	18.75	45	45	90	45	90	0	0
Lead Acid (I)	0	0	0	0	0	0	234	0

(iv) Generation of EPR Certificates for recovered metals by the Recyclers

Recycler will process the Waste Battery and File Quarterly returns on the EPR Portal. Recycler will update the following data on quarterly basis through the Online EPR Portal:

- A. Waste Battery Procurement Details
- B. Waste Battery Processing details
- C. Quantity of individual metals recovered from processing of Waste Battery
- D. Sales Data and Invoices of the Metals Sold



a. EPR certificates for Iron (Fe) = Weight of Iron sold after recovery from recycling = 150 kg

- b. EPR certificates for Aluminium (Al) = Weight of Aluminium sold after recovery from recycling = 100 kg
- c. EPR certificates for Nickel (Ni) = Weight of Nickel sold after recovery from recycling = 100 kg
- d. EPR certificates for Lithium (Li) = Weight of Lithium sold after recovery from recycling = 50 kg
- e. EPR certificates for Cobalt (Co) = Weight of Cobalt sold after recovery from recycling = 200 kg
- f. EPR certificates for Manganese (Mn) = Weight of Manganese sold after recovery from recycling = 100 kg

Check: EPR certificate will be generated for the quantity of recovered metal **sold**. Sales invoice of sold metal is to be provided by the Recycler. After the sales of metal, the EPR certificates (in kg) will be updated in the Recycler’s Wallet. Calculation will be based on Pure Metals (as Li, Co Ni, etc.)

Wallet of Recycler

Metals recovered	Lithium (Li)	Nickel (Ni)	Manganese (Mn)	Cobalt (Co)	Aluminium (Al)	Iron (Fe)	Lead (Pb)	Copper (Cu)
Quantity (in kg)	50	100	100	200	100	150	0	0

(v) Exchange of EPR certificates between Producer and Recyclers

As per the obligations of Producer for different kind of battery, the Producer will take EPR certificates for different metals from the Recycler.

The quantity of EPR certificates traded by the Recycler will be deducted from the Wallet of the Recycler.

Certificates provided by the Recyclers to Producer

- The Wallet of Recycler will be updated once the EPR certificates are exchanged.

Update Wallet of Recycler

Metals recovered	Lithium (Li)	Nickel (Ni)	Manganese (Mn)	Cobalt (Co)	Aluminium (Al)	Iron (Fe)	Lead (Pb)	Copper (Cu)
Quantity (in kg)	31.25	55	55	110	55	60	0	0

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