JCM Proposed Methodology Form

Cover sheet of the Proposed Methodology Form

Form for submitting the proposed methodology

Host Country	Socialist Republic of Vietnam
Name of the methodology proponents submitting this form	Hitachi Chemical Co., Ltd.
Sectoral scope(s) to which the Proposed Methodology applies	3. Energy demand
Title of the proposed methodology, and version number	Installation of Container Formation Facility at Acid Lead Battery Factory, Version 01.0
List of documents to be attached to this form (please check):	☐The attached draft JCM-PDD: ☒Additional information
Date of completion	04/11/2016

History of the proposed methodology

Version	Date	Contents revised
1.0	04/11/2016	First edition as a proposed methodology

A. Title of the methodology

Installation of Container Formation Facility at Acid Lead Battery Factory, Version 01.0

B. Terms and definitions

Terms	Definitions
container formation	A formation method of acid lead battery in which the battery is assembled with non-converted plates and then converted in the container.
container formation facility	A facility in which container formation of acid lead battery is done. Two processes of tank formation (formation and charging) are integrated into this facility. Drying facility in tank formation is no longer needed in container formation.
tank formation	A formation method of acid lead battery in which the plates are converted in a formation tank after being manufactured and then assembled into a battery.
tank formation facilities	Facilities including "formation tank" and "washing facility" at tank formation process, "drying facility" at plate drying process, and "charging facility" at charging process.

C. Summary of the methodology

Items	Summary
GHG emission reduction measures	Installation of container formation facility at acid lead battery production line in place of tank formation facilities leads to reduction of electricity and fossil fuel consumption by the production line.
Calculation of reference emissions	Reference emissions from electricity consumption are calculated by multiplying electricity consumption of reference tank formation facilities and CO_2 emission factor for electricity consumed. Electricity consumption of reference tank formation facilities is calculated with production output of acid lead battery and

	specific electricity consumption by the reference facilities. Reference emissions from fuel consumption are calculated by multiplying net calorific value required for fuel consumption to produce acid lead battery by reference tank formation facilities and CO_2 emission factor. Net calorific value required for fuel consumption to produce acid lead battery by reference tank formation facilities is calculated with production output of acid lead battery and specific net calorific value required for fuel consumption per acid lead battery by the reference facilities.
Calculation of project emissions	Project emissions are calculated by multiplying electricity consumption of project container formation facility and CO_2 emission factor for electricity consumed.
Monitoring parameters	● Production output of acid lead battery at the container formation facility in the project factory per acid lead battery type ● Capacity of acid lead battery ● Electricity consumption by the container formation facility in the project factory

D. Eligibility criteria

This methodology is applicable to projects that satisfy all of the following criteria.

Criterion 1	Container formation facility is newly installed or installed to replace tank formation facilities at acid lead battery production line.

E. Emission Sources and GHG types

Reference emissions	
Emission sources	GHG types
Electricity consumption by tank formation facilities	CO_2
Fossil fuel (LPG) consumption by tank formation facilities	CO_2
Electricity consumption by chiller and cooling tower	CO_2
Project emissions	
Emission sources	GHG types

Electricity consumption by container formation facility	CO_2
Electricity consumption by cooling chiller and cooling tower	CO_2

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

Electricity and fossil fuel are consumed for the process of producing acid lead batteries in tank formation facilities.

Reference emissions from electricity consumption are calculated by multiplying specific electricity consumption per unit of acid lead battery (SEC_{RE}) [kWh/unit], production output of acid lead battery [units/p], and CO_2 emission factor for electricity consumed [tCO_2/MWh].

Reference emissions from fuel consumption are calculated by multiplying specific net calorific value required for fuel consumption per unit of acid lead battery ($SNCV_{RE}$) [MJ/unit], production output of acid lead battery [units/period] and CO_2 emission factor for fuel which is determined as per a factory where a JCM project is implemented [tCO_2/GJ].

In this methodology, SEC_{RE} is calculated with the equation specified, which is formulated in a conservative manner by excluding the electricity consumption by chiller and cooling tower to achieve net emission reductions while typical configuration of the equipment for producing acid lead batteries in tank formation facilities consists of the followings: formation tank, charging facility, chiller and cooling tower and other tank formation facilities such as washing facility and/or drying facility.

F.2. Calculation of reference emissions

$$RE_p = \sum_k \left[\left(EC_{RE,k,p} \times EF_{elec,k} \right) + \left(NCV_{RE,k,p} \times EF_{fuel,k} \right) \right]$$

$$EC_{RE,k,p} = \sum_i \left(SEC_{RE,i,k} \times N_{i,k,p} \right) \times \frac{1}{1{,}000}$$

$$NCV_{RE,k,p} = \sum_i \left(SNCV_{RE,i,k} \times N_{i,k,p} \right) \times \frac{1}{1{,}000}$$

$$SEC_{RE,i,k} = 0.1338 \times AH_i + 0.1531$$

$$SNCV_{RE,i,k} = 0.3282 \times AH_i + 0.9377$$

Where

RE_p	Reference emissions during the period *p* [tCO_2/p]
$EC_{RE,k,p}$	Electricity consumption by tank formation facilities in the project factory *k* during the period *p* [MWh/p]
$EF_{elec,k}$	CO_2 emission factor for electricity consumed in the project factory *k* [tCO_2/MWh]
$NCV_{RE,k,p}$	Net calorific value required for fuel consumption to produce acid lead battery by tank formation facilities in the project factory *k* during the period *p* [GJ/p]
$EF_{fuel,k}$	CO_2 emission factor for fuel applicable to the project factory *k* [tCO_2/GJ]
$SEC_{RE,i,k}$	Specific electricity consumption per acid lead battery *i* by the reference facilities in the project factory *k* [kWh/unit]
$SNCV_{RE,i,k}$	Specific net calorific value required for fuel consumption per acid lead battery *i* by the reference facilities in the project factory *k* [MJ/unit]
$N_{i,k,p}$	Production output of acid lead battery *i* in the project factory *k* during the period *p* [units/p]
AH_i	Capacity of acid lead battery *i* [Ah/unit]
i	Identification number of the project acid lead battery type
k	Identification number of the project factory

G. Calculation of project emissions

$$PE_p = \sum_k \left(EC_{PJ,j,k,p} \times EF_{elec,k}\right)$$

Where

PE_p	Project emissions during the period *p* [tCO_2/p]
$EC_{PJ,k,p}$	Electricity consumption by the container formation facilities in the project factory *k* during the period *p* [MWh/p]
$EF_{elec,k}$	CO_2 emission factor for electricity consumed in the project factory *k* [tCO_2/MWh]
k	Identification number of the project factory

H. Calculation of emissions reductions

$$ER_p = RE_p - PE_p$$

Where

ER_p	Emission reductions during the period *p* [tCO_2/p]
RE_p	Reference emissions during the period *p* [tCO_2/p]
PE_p	Project emissions during the period *p* [tCO_2/p]

I. Data and parameters fixed *ex ante*

The source of each data and parameter fixed *ex ante* is listed as below.

Parameter	Description of data	Source
$EF_{elec,k}$	CO_2 emission factor for electricity consumed in the project factory *k* [tCO_2/MWh] When project container formation facility consumes only grid electricity or captive electricity, the project participant applies the CO_2 emission factor respectively. When project container formation facility may consume both grid electricity and captive electricity, the project participant applies the CO_2 emission factor with lower value. [CO_2 emission factor] For grid electricity: The most recent value available from the source stated in this table at the time of validation For captive electricity: 0.8* [tCO_2/MWh] *The most recent value available from CDM approved small scale methodology AMS-I.A at the time of validation is applied.	[Grid electricity] Ministry of Natural Resources and Environment (MONRE), Vietnamese DNA for CDM unless otherwise instructed by the Joint Committee. [Captive electricity] CDM approved small scale methodology AMS-I.A

$EF_{fuel,k}$	CO_2 emission factor for fuel applicable to the project factory *k* [tCO_2/GJ] In case tank formation facilities exist in the project factory prior to the project implementation, the lowest CO_2 emission factor of the fuel used by the facilities may be applied. Otherwise, CO_2 emission factor for Natural Gas is applied.	Country specific data or IPCC default value from "2006 IPCC Guidelines for National Greenhouse Gas Inventory". Lower limit value of the default net calorific value is applied.