



# GREENHOUSE GAS EMISSIONS INVENTORY REPORT

*BASED ON US EPA EMISSION FACTOR*

## NIPPON MICROMETAL CORPORATION PHILIPPINES

First Philippine Industrial Park (FPIP), Brgy. Sta. Anastacia, Sto. Tomas,  
Batangas, Philippines

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## Document History

**Project Name:** GHG Emissions Inventory Report of NMCP  
**Client Name:** Nippon Micrometal Corporation Philippines  
**Reference No.:** PHIL5598

This document was written and amended as follows:

	Name	Role	Signature	Date
Prepared by:	John Mateo	Sustainability Manager		21 May 2025
Approved by:	Renz Duño	Certification – Business Unit Head		30 May 2025

# EXECUTIVE SUMMARY

This Greenhouse Gas (GHG) Emissions Inventory Report presents the quantified GHG emissions of Nippon Micrometal Corporation Philippines (NMCP) for the reporting period of January 1 to December 31, 2024. The inventory was developed in accordance with internationally recognized standards, including the GHG Protocol Corporate Standard and ISO 14064-1:2018, and utilizes emission factors from the US EPA Emission Factors 2025 Database.

GHG emissions were categorized and reported under Scope 1 (Direct Emissions) and Scope 2 (Indirect Emissions from purchased electricity). Emissions under Scope 1 were attributed to stationary combustion (diesel generator sets and LPG tanks), mobile combustion (company-controlled service vehicles), and fugitive emissions (refrigerant used from air-conditioning systems). Scope 2 emissions resulted from the consumption of grid-supplied electricity across NMCP facilities.

The total GHG emissions for calendar year 2024 were estimated at 3,052.45 metric tons of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e), of which:

- Scope 1 emissions accounted for 395.12 tCO<sub>2</sub>e, comprising:
  - Generator sets: 17.92 tCO<sub>2</sub>e
  - LPG combustion: 4.39 tCO<sub>2</sub>e
  - Service vehicles: 101.01 tCO<sub>2</sub>e
  - Refrigerants: 271.79 tCO<sub>2</sub>e
- Scope 2 emissions from purchased electricity accounted for 2,657.33 tCO<sub>2</sub>e, based on a location-based emission factor of 0.7181 tCO<sub>2</sub>/MWh published by the Department of Energy.

An uncertainty analysis was performed following the IPCC 2019 Refinement guidelines, yielding a combined uncertainty of  $\pm 3.73\%$  for the baseline emissions estimate, indicating a high level of confidence in the data quality, emission factors, and assumptions applied.

NMCP's baseline emissions inventory will serve as a benchmark for future GHG reporting, performance monitoring, and development of emissions reduction strategies. The company has already initiated several GHG mitigation measures, including the full transition to LED lighting (completed in 2018) and the replacement of refrigerants with lower-GWP alternatives (R-32 replacing R-410A). Additionally, the integration of renewable energy into NMCP's power supply is planned for implementation starting in Q1 2025.

This report reinforces NMCP's commitment to sustainability, operational transparency, and continuous improvement in environmental performance. It provides a data-driven foundation to support informed decision-making, compliance with stakeholder and regulatory expectations, and alignment with global climate action goals.



# SCOPE 3 GREENHOUSE GAS EMISSIONS INVENTORY REPORT

*(Based on the emission factor from Solders in Electronics: A Life Cycle Assessment designed for US EPA )*

## NIPPON MICROMETAL CORPORATION PHILIPPINES

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Approved by:	Renz Duño	Certification – Business Unit Head		18 August 2025

# EXECUTIVE SUMMARY

This Scope 3 Greenhouse Gas (GHG) Emissions Inventory Report quantifies the upstream emissions associated with the purchase of bar solder materials—specifically LF31, LF35, and LF45—used by Nippon Micrometal Philippines Corporation (NMCP) from January to December 2024, calendar year. The emissions calculated fall under Category 1: Purchased Goods and Services, as defined by the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Excluded from the boundary of this report are emissions related to packaging, storage, downstream use, and end-of-life treatment of products.

The emissions inventory adheres to the principles of relevance, completeness, consistency, transparency, and accuracy, in line with ISO 14064-1:2018 and the GHG Protocol's Technical Guidance for Calculating Scope 3 Emissions. The methodology employed combines actual procurement records with cradle-to-gate life cycle assessment data. Because product-specific emission factors for the bar solders were unavailable, credible secondary sources were used. Data from the U.S. EPA-commissioned study "Solders in Electronics: A Life Cycle Assessment" served as the basis for emission factor development. For LF31 and LF45, SnCu alloy data were used due to identical composition, while for LF35, an average of SAC and SnCu alloy emission factors was applied to account for its nickel content.

Emission factors were calculated using the product's density and cradle-to-gate GHG intensity. The resulting factors were the following:

- 13.02 kg CO<sub>2</sub>e per kilogram for LF31 and LF45
- 22.61 kg CO<sub>2</sub>e per kilogram for LF35

These values were then applied to the respective quantities of each solder alloy procured by NMCP during the reporting year using a standard calculation formula (GHG Emissions = Activity Data × Emission Factor). A total of **138.27 metric tons of CO<sub>2</sub>e emissions** were generated from the procurement of these materials in 2024. This total was derived from the cumulative GHG emissions of 6,600 kg of LF35, 160 kg of LF45, and 40 kg of LF31.

The completion of this inventory reinforces NMCP's commitment to sustainability and transparent reporting. It provides a credible and actionable emissions baseline that will support decision-making, stakeholder communication, and continuous improvement in supply chain environmental performance.