Smart PCF Report

No.: ETN25900025M01 Date: 27-Oct-2025

ZENITH CHEMICAL CORPORATION
NO.9, YOUE-LIOU. RD., YOUTH INDUSTRIAL DISTRICT, TACHIA CITY, TAICHUNG HSIEN, 437, TAIWAN

The following sample(s) was/were submitted and identified by the applicant as:

Sample Submitted By	:	ZENITH CHEMICAL CORPORATION
Sample Name	:	Nickel Sulphate

==========

Sample Receiving Date	:	01-Oct-2025
Lead Time	:	01-Oct-2025 to 17-Oct-2025
The Smart PCF Results	:	These results are derived from estimation parameters specified by client. Comprehensive details are provided in the subsequent pages to offer an in-depth understanding of the product's carbon footprint.

PIN CODE: 4AE14A4E

ZENITH CHEMICAL CORPORATION
NO.9, YOUE-LIOU. RD., YOUTH INDUSTRIAL DISTRICT, TACHIA CITY, TAICHUNG HSIEN, 437, TAIWAN

General Information

Company Name	:	ZENITH CHEMICAL CORPORATION
Factory Location	:	No.9, YOUE-LIOU. RD., YOUTH INDUSTY DISTRICT., TACHIA CITY, TAICHUNG HSIEN 437, TAIWAN

Product Information

Product Name	:	Nickel Sulphate
Model number	:	$NiSO_4 \cdot 6H_2O$
Product Category Rules (PCR)	:	None
Life Cycle Stages	:	Raw Material Acquisition stage - Manufacturing stage
Declared Unit	:	per kilogram
Data Collection Period	:	1-Jul-2024 to 30-Jun-2025

Allocation Methodology

Allocation Principle(s)	:	Production allocation
Allocation Ratio(s)	:	80.71%

ZENITH CHEMICAL CORPORATION
NO.9, YOUE-LIOU. RD., YOUTH INDUSTRIAL DISTRICT, TACHIA CITY, TAICHUNG HSIEN, 437, TAIWAN

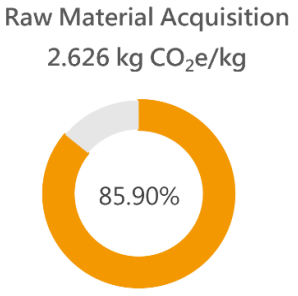
Smart PCF Results

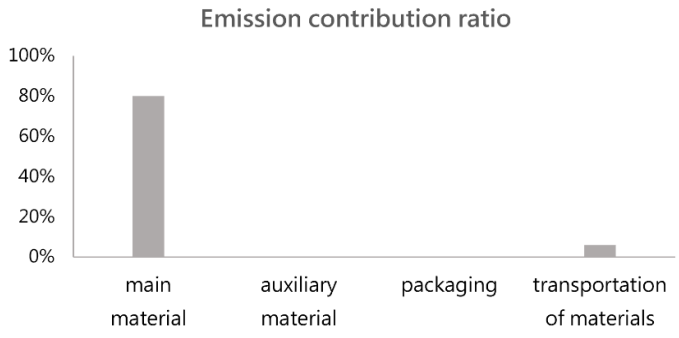
Based on the data and information submitted by client, along with emission factors sourced from various databases, the estimated carbon footprint for Nickel Sulphate($NiSO_4 \cdot 6H_2O$) is 3.057 $kgCO_2e/kg$.

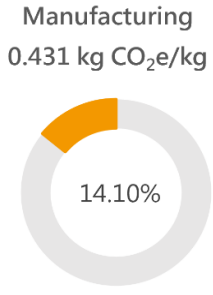
Life Cycle Stage Breakdown

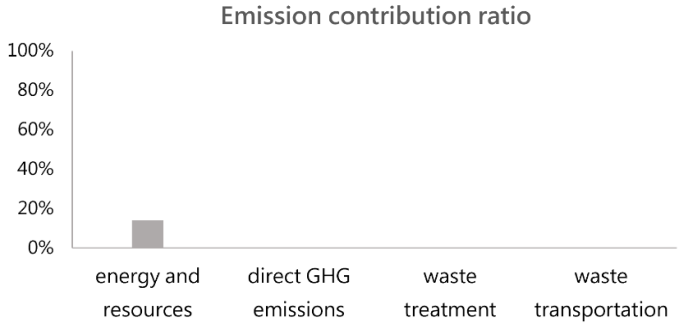
The detailed breakdown provides a comprehensive view of the contributions to the product carbon footprint at each stage of the life cycle, identifying key areas for potential emission reduction strategies.
1. Overall Contribution of Raw Material Acquisition: 85.90%, including main material 79.88%, auxiliary material 0.03%, packaging 0.01% and transportation of materials 5.99%.
2. Overall Contribution of Manufacturing: 14.10%, including energy and resources 14.07%, direct GHG emissions 0.01%, waste treatment 0.01% and waste transportation 0.00%.

Based on the analysis, the three largest sources of emissions are identified as follows:
1. Raw Material Acquisition stage - main material, accounting for 79.88% of the total;
2. Manufacturing stage - energy and resources, accounting for 14.07% of the total;
3. Raw Material Acquisition stage - transportation of materials, accounting for 5.99% of the total.









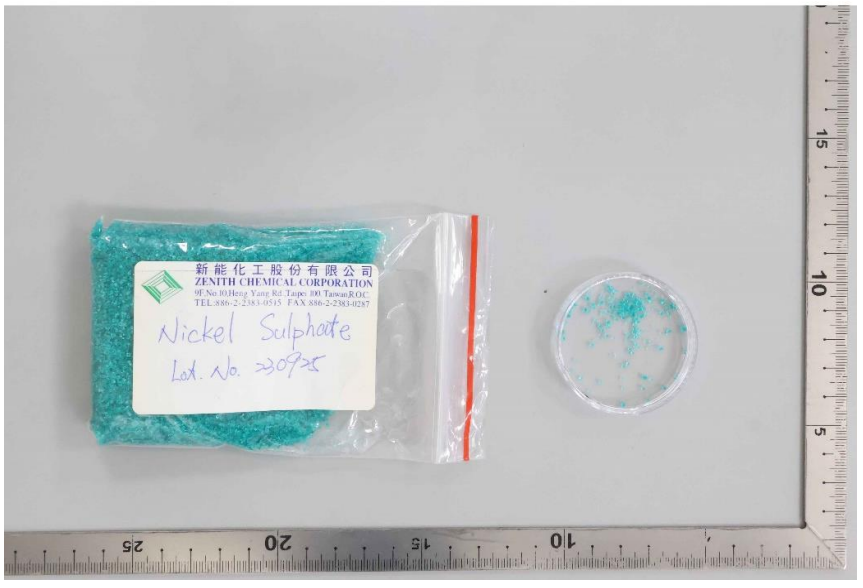
ZENITH CHEMICAL CORPORATION
NO.9, YOUE-LIOU. RD., YOUTH INDUSTRIAL DISTRICT, TACHIA CITY, TAICHUNG HSIEN, 437, TAIWAN

Remarks：

1. This report is a simplified product carbon footprint study, based on certain assumptions, estimations, and exclusions. Consequently, the results may differ from a full carbon footprint study prepared in accordance with ISO 14067 or other international standards. For more accurate and verifiable information, applicants may consider commissioning a comprehensive life cycle or carbon footprint assessment.
2. The data, factors, and assumptions used in this report are based on the available case-specific information and may not exactly reflect actual conditions. Therefore, the results should be interpreted carefully.
3. The Smart PCF report is calculated based on product information provided by the applicant. Any inaccuracies or updates in the data may affect the validity and applicability of this report.
4. When the emission contribution is reported as 0.00%, it indicates that the item has a relatively low contribution to the product's carbon footprint; it does not imply that there are no emissions.
5. Emission values and percentages have been rounded, which may cause minor discrepancies with totals. These do not materially affect the overall conclusions.
6. GHG Emission Factor Database(s) and Life Cycle Assessment (LCA) Software employed:
    a. Ecoinvent 3.10. Website: https://ecoinvent.org/
    b. EF Database 3.1
    c. SimaPro version 9.6.0.1.
    d. Carbon Footprint Information Platform, Taiwan Environmental Protection Administration. Website: https://cfp-calculate.tw/cfpc/WebPage/Index.aspx
    e. Environmental Protection Administration (EPA) of Taiwan's Greenhouse Gas Emission Factor Database 6.0.4 (環保署溫室氣體排放係數管理表6.0.4版)
7. The scope of the carbon footprint calculation in this report focuses on the "high-purity nickel sulfate" products among the various nickel sulfate products produced by the applicant, ensuring that the assessment is both targeted and representative.
8. The target product's production volume is based on actual output provided by the applicant. As this differs from the theoretical volume estimated from raw material inputs, the actual production slightly exceeds the theoretical value. This discrepancy may not fully reflect the actual environmental burden, introducing a certain degree of uncertainty and potential error in the results.
9. The raw materials for this project (sulfuric acid and nickel powder) are based on actual production data provided by the applicant, which uses proprietary separation technology to sort materials by grade and produce high-purity nickel sulfate.
10. Water is used as a reaction auxiliary. It participates in the reaction but is later separated by evaporation, with the final product obtained in crystalline form. Therefore, water is accounted for as a process input in the Manufacturing Stage.
11. Water use includes tap water and under groundwater. Due to unavailable emission factors for groundwater extraction, only the energy consumption for pumping has been considered.
12. Natural gas used for boiler operation is dedicated to the production of high-purity nickel sulfate and nickel chloride, with output-based allocation.The allocation ratio is 87.24%.
13. The waste polyethylene bags from this project are sent to a recycling facility. Since they are already being recycled, emissions from their further processing are not included.

ZENITH CHEMICAL CORPORATION
NO.9, YOUE-LIOU. RD., YOUTH INDUSTRIAL DISTRICT, TACHIA CITY, TAICHUNG HSIEN, 437, TAIWAN

ETN25900025



** End of Report **