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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 40808.3-2025**

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**Environmental evaluation of machine tools - Part 3: Principles  
for testing metal-cutting machine tools with respect to energy  
efficiency**

机床环境评估 第3部分：金属切削机床能效测试原则

**(English Translation)**

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## Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 3 of GB/T 40808 "Machine Tool Environmental Assessment". GB/T 40808 has already published the following parts.

---Part 1: Energy-Saving Design Methods for Machine Tools;

---Part 2: Methods for measuring energy consumption of machine tools and machine tool components;

---Part 3: Principles for Energy Efficiency Testing of Metal Cutting Machine Tools this document adopts ISO 14955-3:2020 "Machine tools - Environmental assessment - Part 3: Energy efficiency testing of metal cutting machine tools".

but".

The following minimal editorial changes have been made to this document.

---To align with existing standards, the standard name has been changed to "Machine Tool Environmental Assessment Part 3: Energy Efficiency Testing Principles for Metal Cutting Machine Tools".

but".

Please note that some content in this document may involve patents. The issuing

organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Metal Cutting Machine Tools (SAC/TC22).

## Introduction

Machine tools are complex industrial products used to manufacture parts or semi-finished products. The performance of a machine tool is related to its economic value, technical specifications, and operational requirements.

Related factors are key considerations for investment. Even with the same machine tool, in actual use, the different parts being processed and their processing techniques will vary.

The energy consumption of different machine tools will also vary. Therefore, when conducting an environmental impact assessment of a machine tool, it is necessary to consider the machine tool's operating conditions.

GB/T 40808 aims to quantify the environmental impact improvement of machine tools over a period of time, based on a series of available and positive machine tool environmental standards.

The environmental impact indicators for machine tools will be assessed, and will consist of five parts.

---Part 1: Energy-Saving Design Methods for Machine Tools. The aim is to provide methods for reducing the environmental impact of energy consumption during machine tool operation.

Machine tool design and manufacturing guidelines.

---Part 2: Methods for Measuring Energy Consumption of Machine Tools and Machine Tool Components. The purpose is to provide necessary methods for measuring the energy consumption of machine tools and machine tool components.

Parameters and calculation methods.

---Part 3: Principles for Energy Efficiency Testing of Metal Cutting Machine Tools. The purpose is to provide guidelines for energy efficiency testing of metal cutting machine tools as specified in GB/T 40808.1 and GB/T 40808.2.

These are the application principles and methods in machine tools.

---Part 4: Energy Efficiency Testing Principles for Metal Forming Machine Tools and Laser Processing Machine Tools. The purpose is to provide guidance for testing energy efficiency in GB/T 40808.1 and...

GB/T 40808.2 Principles and methods for application in metal forming machine tools and laser processing machine tools.

---Part 5: Energy Efficiency Testing Principles for Woodworking Machine Tools. The purpose is to provide guidelines for energy efficiency testing of woodworking machine tools according to GB/T 40808.1 and GB/T 40808.2.

Application principles and methods in bed.

This document is Part 3 of GB/T 40808, and the proposed reference scenarios reflect existing knowledge of actual underwater machine tool processes.

The definition and measurement of the test scenario help to identify application-related improvement potential, and the application of the methods defined in GB/T 40808.1 also...

This helps to identify relevant improvement measures for specific industrial drive applications.

The GB/T 40808 series of standards focuses on the relevant environmental impacts of machine tools during their use. In addition to the design and engineering of the machine tools, this document also addresses...

And the intended use of the machine tool.

Machine Tool Environmental Assessment Part 3.

Energy efficiency testing principles for metal cutting machine tools

## 1 Scope

This document applies to energy-saving design methods conforming to GB/T 40808.1-2021 and the definitions in GB/T 40808.2-2025.

This document describes methods for measuring the energy consumption of machine tools and machine tool components. Based on a reference scenario, it introduces environmental assessments for machine tools during their use and uses data analysis to demonstrate this.

The following example illustrates the use of cutting machine tools.

This document defines a methodology for evaluating machine tool operating status based on specific reference scenarios, used for machine tool energy consumption assessment, and incorporates energy efficiency methods.

Factors related to surface dimensions are incorporated into machine tool design.

This document describes the measurement requirements in GB/T 40808.1-2021 and GB/T 40808.2-2025, and demonstrates how to measure them.

The reference scenario for evaluating the "machining" stage of a machine tool is based on the provisions of GB/T 40808.1-2021.

Appendix A provides usage examples for this document.

It should be noted that the results of using this document are affected by user behavior and manufacturing strategies during the usage phase. This document is not applicable to machine tools.

The contrast between them.

## 2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 40808.1-2021 Machine tool environmental assessment - Part 1: Energy-efficient design methods for machine tools (ISO 14955-1:2017, IDT) GB/T 40808.2-2025 Machine tool environmental assessment - Part 2: Methods for measuring energy consumption of machine tools and machine tool components (ISO 14955-2:2018, IDT) definitions, division

## 3 Terms and Definitions

The terms and definitions defined in GB/T 40808.1-2021 and GB/T 40808.2-2025, as well as the following terms and definitions, apply to this document.

ISO and IEC maintain a terminology database for standardization work, available at the following URL.

Reference part

Workpieces with specified geometry, materials, dimensions, geometric tolerances, surface quality, and related manufacturing procedures.

**Note:** The reference part is a geometric workpiece manufactured under specified operating conditions, with a given composition and dimensions, and a defined quantity.

Reference scenario

The specific manufacturing process includes the definition of part processing and the environmental conditions for implementing the specific reference part.