
**Machine tools — Environmental
evaluation of machine tools —**

**Part 4:
Principles for measuring metal-
forming machine tools and laser
processing machine tools with respect
to energy efficiency**

*Machines-outils — Évaluation environnementale des machines-
outils —*

*Partie 4: Principes de mesurage de l'efficacité énergétique des
machines-outils de formage des métaux et des machines-outils à laser*

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 39, *Machine tools*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

A list of all parts in the ISO 14955 series can be found on the ISO website.

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Introduction

As environmental impact is a common challenge for all products and natural resources become scarce, environmental performance criteria for machine tools need to be defined and the use of these criteria need to be specified.

Machine tools are complex products for used by industry to manufacture workpieces ready for use or semi-finished products. Their environmental impact includes waste raw material, use of auxiliary substances such as lubricants and other material flows as well as the conversion of electrical energy into heat, the dissipation of heat to the atmosphere or heat exchange by fluids and eventually the use of other resources such as compressed air.

Based on relevance considerations, the ISO 14955 series is focussed on environmental impacts during the use phase.

The performance of a machine tool as key data for investment is multi-dimensional regarding its economic value, its technical specification and its operating requirements, which are influenced by the specific application. The energy supplied to the same machine tool can vary depending on the workpiece manufactured and the conditions under which the machine tool is operated. Therefore, the environmental evaluation of a machine tool cannot be performed without considering of these aspects.

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Machine tools — Environmental evaluation of machine tools —

Part 4: Principles for measuring metal-forming machine tools and laser processing machine tools with respect to energy efficiency

1 Scope

This document specifies technical requirements and measures for testing procedures for evaluation of energy required to be adopted by persons undertaking the design, manufacture and supply of metal forming and laser processing machine tools in order to achieve reproducible data about the energy supplied under specified conditions. Furthermore, it provides methods for quantifying the energy supplied to components in order to assign their share to generalized machine tool functions as described in ISO 14955-1.

Along with ISO 14955-1 and ISO 14955-2, it covers all significant energy requirements relevant to hydraulic (servo) and mechanical (servo) presses, turret punch presses and press brakes, pipe benders, laser processing machine tools, when they are used as intended and under the conditions foreseen by the manufacturer. Examples of how to perform energy evaluation on metal-forming machine tools are given in the annexes.

This document is applicable to machine tools which transmit force mechanically or transmit energy by laser light to cut, form, or work metal or other materials by means of dies attached to or operated by slides, punches or beams as well as to lasers ranging in size from small high speed machine tools producing small work-pieces to large relatively slow speed machine tools and large work-pieces. This document covers machine tools whose primary intended use is to work metal, but which can be used in the same way to work other materials (e.g. cardboard, plastic, rubber, leather, etc.).

It also applies to auxiliary devices supplied as an integral part of the machine tool and to machine tools which are part of an integrated manufacturing system where the energy required is comparable to those of machine tools working separately.

This document does not give test procedures for the energy requirements of tools or dies attached to the machine tools.

It is not applicable to machine tools whose principal designed purpose is:

- metal-cutting by milling, drilling or turning;
- metal-cutting by oxygen or water cutting;
- attaching a fastener, e.g. riveting, stapling or stitching;
- bending or folding by folding machine tools;
- straightening;
- extruding;
- drop forging or drop stamping;
- compaction of metal powder;