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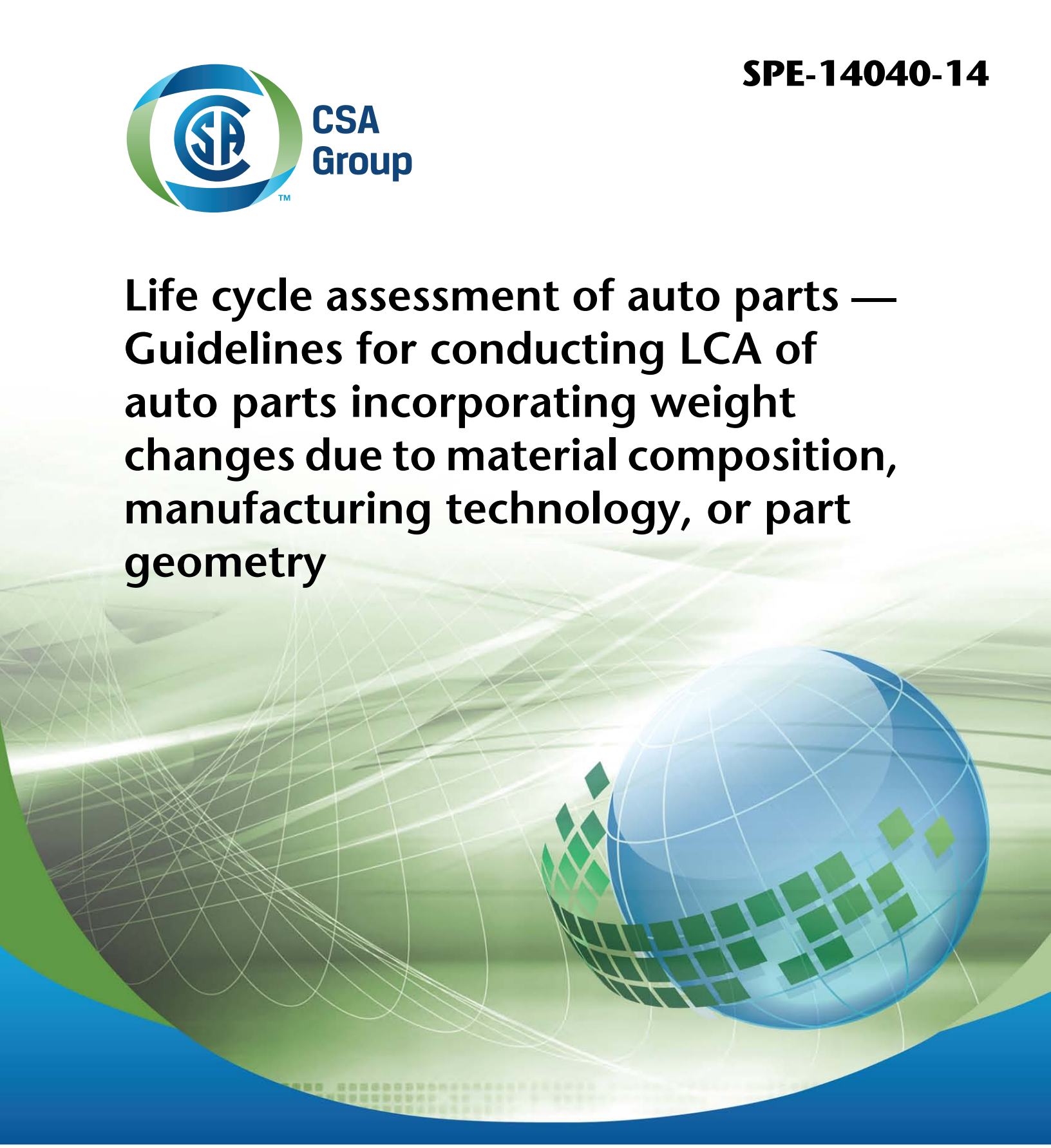
Life cycle assessment of auto parts — Guidelines for conducting LCA of auto parts incorporating weight changes due to material composition, manufacturing technology, or part geometry



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Peer Review

This Guideline has been reviewed for technical accuracy, conformance with ISO 14040/44:2006 principles, and general relevance and applicability by the following independent experts:

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Preface

This Guideline establishes the requirements for conducting comparative life cycle assessments (LCA) of auto parts incorporating weight changes due to changes in material composition, manufacturing technology, or part geometry, and in conformance with the International Organization for Standardization (ISO) 14040 series of standards.

Although informative in nature, this Guideline has been written in mandatory language to facilitate adoption by organizations.

CSA Group acknowledges that the development of this Guideline was made possible, in part, by the financial support of Natural Resources Canada (NRCan).

This Guideline was prepared by the Technical Development Group on Auto Parts, and reviewed for technical accuracy and practical feasibility by a Peer Review Panel.

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *Although the intended primary application of this Guideline is stated in its Scope, it is important to note that it remains the responsibility of the users of the Guideline to judge its suitability for their particular purpose.*

(3) *To submit a proposal for change, please send the following information to* ***inquiries@csagroup.org*** *and include "Proposal for change" in the subject line:*

- *(a) designation (number);*
- *(b) relevant clause, table, and/or figure number;*
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- *(d) rationale for the change.*

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0 Introduction

0.1
The purpose of this Guideline is to provide rules for quantifying the potential environmental impacts of weight changes of automotive parts, components, assemblies, and subassemblies (collectively referred to as "auto part"), manufactured by or for North American automotive OEMs (original equipment manufacturer), and either installed in vehicles or sold on the aftermarket for use in North America, due to changes in material composition, manufacturing technology, or part geometry.

0.2
This Guideline establishes rules and requirements for conducting comparative life cycle assessment (LCA) studies with the objective of providing clear and consistent guidance for assessing potential environmental impacts throughout the cradle-to-grave life cycle of an auto part with a focus on weight differences between design options. The life cycle stages include
(a) raw material acquisition;
(b) production;
(c) use; and
(d) end-of-life treatment (including recycling and final disposal).

0.3
This Guideline is primarily aimed at conducting comparative LCA studies on auto parts that are
(a) intended to be installed in a vehicle, for the purpose of supporting internal design decisions in the vehicle development cycle and possible external communication; or
(b) already installed in a vehicle, for the purpose of external communication.

Interested parties include auto part OEMs and suppliers, auto manufacturers, industry associations, governmental organizations, policy makers and other stakeholders who desire reliable information on auto parts.

In conformance with ISO 14044, Clause 6.3, a panel of interested parties conduct critical reviews on LCA studies where the results are intended to be used to support comparative assertion intended to be disclosed to the public.

0.4
This Guideline enables LCA studies to be conducted using agreed upon and uniform rules, and allows for the comparison of LCA study results between auto parts. Potential uses may include, but are not limited to
(a) design and development decisions for auto parts and automobiles;

(b) evaluation of materials choices and materials substitution options;
(c) evaluation of fabrication and manufacturing options;
(d) assessment of alternative product configurations;
(e) benchmarking for programs aimed at reducing environmental impacts; and
(f) educational purposes, so that a greater understanding of life cycle impacts will inform sourcing and purchasing decisions.

0.5

This Guideline defines specific rules and requirements for:
(a) the specification of performance characteristics and description of an auto part;
(b) definition of the functional unit and the reference flow for LCA of an auto part;
(c) the system boundaries for the LCA of an auto part;
(d) predetermined parameters to be used in LCA studies of products belonging to the category;
(e) inputs and outputs to be included in LCA studies of an auto part;
(f) sources of data for life cycle inventory analysis of resource inputs and emissions outputs;
(g) data requirements for carrying out the LCA;
(h) life cycle impact assessment category indicators to be included in the LCA;
(i) methodology for calculations in the LCA; and
(j) additional key environmental information that may be relevant for the intended use.

0.6

In line with ISO 14044, Clause 4.4.5, results calculated using this Guideline are not intended to provide a single overall score or number on the overall environmental performance of these products.

0.7

This Guideline does not directly address potential social and economic impacts that might be associated with an auto part.

0.8

This Guideline supports and provides additional rules and requirements for conducting LCA studies in accordance with the ISO 14040 Series of Standards.

1 Scope

1.1

This Guideline establishes requirements and principles for undertaking comparative LCA studies of auto parts incorporating weight changes due to material composition, manufacturing technology, or part geometry, whether intended or not intended to be disclosed to the public.

1.2

This Guideline provides a framework for LCA of auto parts made of any material(s) and the effect of weight changes on use stage fuel consumption when comparing two or more design options.
Note: *Examples of materials include metals, polymers, bio-based materials, or a combination of materials.*

1.3

This Guideline applies only to auto parts used in vehicles with internal combustion engines (ICE), in accordance with Clause 5.2.
Notes:
(1) *Internal combustion engine (ICE) is defined in Clause 3.*
(2) *Future editions of this Guideline might be expanded to any type of automobile.*