

This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)

BS ISO 20140-1:2013



BSI Standards Publication

Automation systems and integration — Evaluating energy efficiency and other factors of manufacturing systems that influence the environment

Part 1: Overview and general principles

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

raising standards worldwide™



This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)

This British Standard is the UK implementation of ISO 20140-1:2013.

The UK participation in its preparation was entrusted to Technical Committee AMT/5, Industrial architectures and integration frameworks.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013. Published by BSI Standards Limited 2013

ISBN 978 0 580 70765 0

ICS 25.040.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2013.

Amendments issued since publication

Date	Text affected
------	---------------

This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)

First edition
2013-05-01

Automation systems and integration — Evaluating energy efficiency and other factors of manufacturing systems that influence the environment —

Part 1: Overview and general principles

*Systèmes d'automatisation et intégration — Évaluation de l'efficacité
énergétique et autres facteurs de fabrication des systèmes qui
influencent l'environnement —*

Partie 1: Aperçu et principes généraux



Reference number
ISO 20140-1:2013(E)

© ISO 2013

This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2013

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms, definitions and abbreviated terms	1
3.1 Terms and definitions.....	2
3.2 Abbreviated terms.....	7
4 Manufacturing system and its environmental influence evaluation	7
4.1 Product life cycle and manufacturing system life history.....	7
4.2 Manufacturing system hierarchical structure.....	10
4.3 Environmental influence evaluation.....	11
5 Evaluation method of environmental influence	11
5.1 Methodology of environmental influence evaluation.....	11
5.2 Unit process of manufacturing process.....	12
5.3 Environmental influence.....	14
5.4 Environmental index evaluation.....	14
6 Evaluation process of environmental influence	15
6.1 Evaluation process of environmental index.....	15
6.2 Aggregation process of environmental influence.....	16
6.3 Allocation/charge process of indirect/CRR influence.....	16
7 Data for environmental influence evaluation	17
7.1 General.....	17
7.2 Data categories for environmental influence evaluation.....	17
7.3 Actual data in operation step.....	18
7.4 Actual data in construction/reconfiguration and retirement step.....	18
7.5 Reference data.....	18
7.6 Environmental characteristics data (ECD).....	19
7.7 Existing data standards.....	19
Annex A (informative) Activity model of manufacturing system life history and its environmental influence	20
Annex B (informative) Responsibility of organization with regard to environmental influence	29
Annex C (informative) Use cases of ISO 20140	31
Annex D (informative) Input to/output from unit process	33
Annex E (informative) Conformance classes of ISO 20140	34
Annex F (informative) Structure of ISO 20140	36
Bibliography	42

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is ISO/TC 184, *Automation systems and integration*, Subcommittee SC 5, *Interoperability, integration, and architectures for enterprise systems and automation applications*.

ISO 20140 consists of the following parts, under the general title *Automation systems and integration — Evaluating energy efficiency and other factors of manufacturing systems that influence the environment*:

— *Part 1: Overview and general principles*

The following parts are under preparation:

— *Part 2: Environmental index evaluation process*

— *Part 3: Environmental influence aggregation process*

— *Part 4: Allocation/charge process of indirect influence/construction, reconfiguration and retirement (CRR) influence*

— *Part 5: Environmental influence evaluation data*

This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)

Introduction

This part of ISO 20140 establishes an overview and general principles of a method for the assessment of environmental influence of manufacturing systems.

ISO 20140 specifies a method for evaluating the energy efficiency of a manufacturing system and other factors, e.g. energy consumption, waste and release, etc., that influence the environment. The evaluation method provides guidelines to analyse the usage of energy by the manufacturing system and the effects of the manufacturing system on the environment. ISO 20140 systematically evaluates the environmental influence through analysing the manufacturing activities and the manufacturing system.

ISO 20140 is intended for discrete products/parts manufacturing systems, such as those used in forming, machining, painting, assembling, testing and other manufacturing processes in the production of aircraft, automobile, electric appliances, machine tools and their components, and other similar products.

The focused application domain of ISO 20140 is a manufacturing system that consists of the hierarchical structure built from individual manufacturing equipment, i.e. a work unit, a work centre, an area, and a factory. ISO 20140 provides evaluation methods for the influence on the environment, resulting from different manufacturing system configurations and from improvements of production management and individual manufacturing equipment operations.

The evaluation method and underlying concept of ISO 20140 can also be used as the foundation for the environmental influence evaluation for continuous processes and/or batch processes.

ISO 20140 can be used for:

- benchmarking of environmental influence with a generic manufacturing system or between different manufacturing systems for producing the same product,
- alternative studies of environmental influence for improving a current manufacturing process, reconfiguring a current manufacturing system/equipment, and designing a new manufacturing system,
- setting the top level target of environmental improvement and the breakdown to intermediate systems, work units and individual manufacturing equipment, and
- improving the shop floor operations by visualizing the actual status of environmental influence.

Expected users of ISO 20140 are:

- a) managers for environmental conditions in a factory, site and enterprise;
- b) engineers for process planning of products;
- c) planners and designers for manufacturing systems; and
- d) engineers and foremen that produce products by operating a manufacturing system.

The structure of ISO 20140 and the relationships between parts are outlined in [Annex F](#).

This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)

This is a preview of "BS ISO 20140-1:2013". [Click here to purchase the full version from the ANSI store.](#)

Automation systems and integration — Evaluating energy efficiency and other factors of manufacturing systems that influence the environment —

Part 1: Overview and general principles

1 Scope

This part of ISO 20140 establishes an overview and general principles of a method for the assessment of environmental influence of manufacturing systems.

ISO 20140 specifies for the discrete products/parts manufacturing sectors a common foundation and methodology for energy efficiency and other factors of environmental influence evaluation, which enables sector specific methods to be applied in characteristic situations.

ISO 20140 enables an assessment to be made of the environmental influence of manufacturing processes, which can be used either to seek an overall reduction in negative influence or an increase in positive results.

The evaluation method of ISO 20140 is applicable to the environmental influence of a manufacturing system which consists of individual manufacturing equipment, and which is configured as a work unit, a work centre, an area or a factory.

ISO 20140 specifies the requirements for the environmental influence data to be captured from the individual manufacturing equipment, as the most granular data for aggregating along the manufacturing system hierarchy.

NOTE The evaluation method and underlying concept of ISO 20140 can be used as the foundation for the environmental influence evaluation for a continuous process and/or a batch process, in common with a discrete products/parts manufacturing process.

The following are outside the scope of ISO 20140:

- the environmental influence evaluation methodology of systems outside the manufacturing system boundaries (e.g. other systems of the same site or other systems of the entire enterprise);
- the environmental influence evaluation methodology to handle the complete product life cycle;
- the method and data for environmental evaluation which are specific to a particular industry sector, manufacturer, or machinery.

2 Normative references

The following referenced documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14040:2006, *Environmental management — Life cycle assessment — Principles and framework*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.