FINAL
DRAFT

INTERNATIONAL
STANDARD

**ISO/FDIS
23434-2**

ISO/TC **110**/SC **5**

Secretariat: SAC

Voting begins on:
2021-09-06

Voting terminates on:
2021-11-01

Industrial trucks — Sustainability —

Part 2:
Factors and reporting

Chariots de manutention — Durabilité —

Partie 2: Facteurs et rapports

Reference number
ISO/FDIS 23434-2:2021(E)

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Published in Switzerland

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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 110, *Industrial Trucks,* Subcommittee SC 5, *Sustainability*.

A list of all parts in the ISO 23434 series can be found on the ISO website.

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.

Industrial trucks — Sustainability —

Part 2:
Factors and reporting

1 Scope

This document identifies sustainability factors and provides an example of a reporting format for sustainability information of industrial trucks.

It is applicable to acquisition of raw materials, design, production, transportation/delivery, use, end-of-life treatment and final disposal of industrial trucks (hereinafter referred to as trucks) as defined in ISO 5053-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 23308 (all parts), *Energy efficiency of industrial trucks — Test methods*

ISO 23434-1, *Industrial trucks — Sustainability — Part 1: Vocabulary*

EN 12053, *Safety of industrial trucks — Test methods for measuring noise emissions*

EN 12895, *Industrial trucks —Electromagnetic compatibility*

EN 13059, *Safety of industrial trucks — Test methods for measuring vibration*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23434-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Sustainability factors

4.1 General

The sustainability factors presented in Table 1 apply for achieving the sustainability balance among environmental, economic and social needs.

Estimates taken from the application of these sustainability factors can be used to provide information on trucks.

NOTE This document identifies typical sustainability factors.

Table 1 — Sustainability factors of trucks

Sustainability factors	Description	Impact aspect	Life cycle phase
Restriction on using of hazardous substances (see 4.2)	Hazardous substance e.g. cadmium, hexavalent chromium, lead, mercury, polybrominated biphenyls, polybrominated diphenyl ethers and asbestos	Environmental/ social	Design
Safety (see 4.3)	Complying with international standards on safety of industrial trucks	Social /economic	
Safe use (see 4.4)	Safe operation of the truck	Environmental/ social	Use
Energy consumption during operation (see 4.5)	Energy used during operation	Environmental/ economic	
Greenhouse gas (GHG) emissions during operation (see 4.6)	Greenhouse gas (GHG) emissions per amount of work done defined by carbon dioxide equivalent (CDE)	Environmental	
Product support for improving operational efficiency (see 4.7)	Information and training to improve operational efficiency	Environmental/ economic	
Truck exhaust emissions (see 4.8)	Engine emission rating limiting nitrogen oxide (NOx), hydrocarbon (HC), carbon monoxide (CO), particulate matter (PM).	Environmental	
	Information about using internal combustion (IC) trucks in a building	Environmental/ social	
Noise emitted (see 4.9)	Sound power level	Environmental/ social	
	Sound pressure level		
Vibration (see 4.10)	Hand–arm vibration	Environmental/ social	
	Whole-body vibration		
Electromagnetic compatibility (see 4.11)	Electromagnetic disturbance level	Environmental/ social	
Consumption of resources during total useful life (4.12)	Resources consumed when owning and operating a truck	Environmental/ economic	
Truck material recyclability and recoverability (see 4.13)	Information in respect of recycling	Environmental/ economic	End-of-life
	Information in respect of reuse		

4.2 Restriction on using of hazardous substances

Truck design should restrict the use of hazardous substances as far as possible.

Measures taken by the manufacturer to avoid the use of hazardous substances may be stated in the report. In this case, the source of reference used for identifying hazardous substances shall also be reported.

4.3 Safety

The methods, e.g. standards, applied by the manufacturer to ensure safety during the useful life of the truck shall be reported.

NOTE 1 International, regional or national standards can be applicable.

NOTE 2 ISO 3691 (all parts) and ISO 10896 (all parts) address safety requirements of trucks.

4.4 Safe use

The environmental and social impact of safe operation and use of the truck depends on the application and cannot be determined by the truck manufacturer. Users shall comply with relevant requirements and shall take such further measures as necessary.

Manufacturers shall supply information for use with the truck in accordance with 4.3.

NOTE ISO 21262 and ISO 11525 (all parts) address safe use.

4.5 Energy consumption during operation

The energy consumption for the truck and the battery and charger efficiency shall be measured and reported according to the relevant parts of ISO 23308 (all parts).

If a test cycle is not defined for the truck type, the truck shall be tested following the principles of the standard series and the test cycles performed shall be reported.

4.6 Greenhouse gas emissions during operation

Carbon dioxide equivalent (CDE) should be used to quantify the greenhouse gas emission generated during operation. Calculation of carbon dioxide equivalent (CDE) shall include greenhouse gases emitted during electric power generation or the combustion of fuels in internal combustion (IC) trucks and the methods in accordance with ISO 23308-1 shall be applied.

4.7 Product support for improving operational efficiency

Operational efficiency is dependent on the skill of the operator and the technique used by the operator. Operator training and management aids can be used to improve efficiency. Manufactures should provide, as applicable, at least the following instructions:

a) instructions for reducing energy consumption during operation, e.g. shutting off the power whilst not in operation, optimization of routes, avoidance of unnecessary driving;

b) instructions for truck maintenance, e.g. maintenance schedule;

c) instruction for managements aids, e.g. indicators on the instruments, fleet management system.

4.8 Truck exhaust emissions

The truck exhaust emissions factor shall be reported by providing the engine emissions level, such as the tier or stage level, and information about using internal combustion engine powered trucks in a building.

4.9 Noise emitted

The truck noise emitted shall be reported in accordance with EN 12053.

4.10 Vibration

The vibration transmitted to the operator shall be reported in accordance with EN 13059.

4.11 Electromagnetic compatibility

The electromagnetic compatibility shall be in accordance with EN 12895.

4.12 Consumption of resources during total useful life

Information about consumption of resources during total useful life enables the truck user to estimate the environmental impact of the operation of a truck. Total useful life cost shall not be used as a comparative measure between trucks unless the application, operating conditions, unit labour and fuel costs, productivity, operating cycle and total useful life of the trucks are the same.

NOTE 1 This information also enables the truck user to calculate the cost of a truck during its useful life. The operating costs and maintenance costs depend on the hours that the truck is used and truck application. The value of the social and economic contribution made by the truck through its life is outside the scope of this document.

To enable the operator to calculate the consumption of resources, the manufacturer shall provide

— information about maintenance intervals (operating hours and/or time), and

— specifications of substantial operating materials (e.g. amount and quality).

NOTE 2 Recording the costs for each truck during useful life and at end-of-life enhances the accuracy of consumption records.

Due to the wide variety of truck applications and working environments, it is not possible to give a standardized calculation method for the consumption of resources during total useful life. Generally, this consumption includes:

— energy (electrical energy or fuel);

— time for daily maintenance, periodic inspection and maintenance or repairs, etc.;

— operating materials (fluid, grease, tyres, filters, belts, hoses, lifting chains, battery, etc.).

The end-of-life calculation can include:

— decommissioning;

— disposal;

— dismantling;

— possibilities of collection.

NOTE 3 End-of-life cost as a factor of total useful life cost is negative where achievable residual value is greater than disposal cost.

4.13 Truck material recyclability and recoverability

Recyclability and recoverability information enables the truck user to assess the possibilities to recycle materials and to reuse parts from the truck.

The manufacturer shall provide

— Information regarding recycling, and

— Information regarding reuse

NOTE 1 Information regarding recycling can include the following:

— methods of disassembling;

— options for recirculation of parts;

— waste management facilities;

— offers of the manufacturer.

NOTE 2 Information regarding reuse can include the following:

— list of parts that can be reused;

— methods of disassembling;

— options for reuse of components (e.g. offer for returning parts to the manufacturer).

NOTE 3 ISO 16714 address recyclability rate and recoverability rate based on the mass calculation.

5 Reporting

Manufacturers should use the format presented in Annex A to provide sustainability factor information, thereby demonstrating sustainability for trucks in a consistent manner.

National or regional requirements to provide additional information can exist.

Annex A
(informative)

Format for providing sustainability factor information for industrial trucks

Table A.1 shows a format for providing sustainability factor information based on Table 1. "Information or references supplied by the manufacturer" has been completed using a diesel truck with hydrodynamic drive as an example for illustrative purposes only.

Table A.1 — Example of a reporting format for sustainability information of industrial trucks

Sustainability factors	Information or reference supplied by manufacturer	Methods of measurement	Life cycle phase
Restriction on using of hazardous substances	The truck does not contain hazardous substance.	National/regional laws and regulation	Design
Safety	The truck complies with ISO 3691-1.	—	
Safe use	Refer to instruction handbook of the truck and, where appropriate, the standards for truck safe use information.	—	Use
Energy consumption during operation	4 l/h	ISO23308-1 and ISO 23308-2	
Greenhouse gas (GHG) emissions during operation	13 kg /h	ISO 23308-1	
Product support for improving operational efficiency	Refer to information for operational efficiency, operator training and maintenance in the instruction handbook of the truck.	—	
Truck exhaust emissions	Engine emission rating: EU stage V	(EU) 2016/1628	
	Keep the room well ventilated when using internal combustion (IC) trucks in a building.	—	
Noise emitted	Sound power level: 103 dB	EN 12053	
Vibration	Whole body vibration: 0,8 m/s^2	EN 13059	
Electromagnetic compatibility	The truck's EMC complies with EN 12895.	EN 12895	
Consumption of resources during total useful life	Refer to instruction handbook and other information for information about maintenance intervals and specifications of substantial operating materials.	—	
	Information regarding recycling:		

NOTE The information in the column of information or reference supplied by manufacturer is for illustrative purpose only.