

BS 8646:2023



BSI Standards Publication

**Use of autonomous mobile machinery
in agriculture and horticulture –
Code of practice**

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Published by BSI Standards Limited 2023

ISBN 978 0 59 21175 7

ICS 5.06.01, 65.060.01

The following BSI references relate to the work on this document:

Committee reference AGE/6/4

Draft for comment 23/30451674 DC

Amendments/corrigenda issued since publication

Date	Text affected
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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 June 2023. It was prepared by Subcommittee AGE/6/4, *Crop robots in agriculture and horticulture*, under the authority of Technical Committee AGE/6, *Agricultural tractors and forestry*. A list of organizations represented on these committees can be obtained on request to the committee manager.

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It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

The word “should” is used to express recommendations of this standard. The word “may” is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word “can” is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this standard. Notes give references and additional information that are important but do not form part of the recommendations.

Commentaries give background information.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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0 Introduction

0.1 Aims

The use of autonomous mobile machinery (AMM) in agriculture and horticulture can be hazardous; especially when integrated with staffed farm operations.

The aims of this British Standard are to:

- a) describe a best practice safety and risk management process that can be applied to farming operations;
- b) provide information on instructions and training for safe operation and maintenance of AMM; and
- c) advise on farm planning, including hazard controls and emergency preparedness.

This British Standard is intended to enable the user to achieve safe integration of AMM into their farming operation.

0.2 Roles and responsibilities

0.2.1 General

This British Standard is aimed at owners and operators; however, it can also be of benefit to designers, manufacturers, importers and distributors.

0.2.2 Owners and operators

The responsibilities of owners and operators include:

- a) fulfilling the duties and obligations of an owner or operator as required by the applicable legislation;
- b) conducting/participating in site risk assessments to determine the suitability of the AMM, including the consideration of external factors beyond the immediate control of the owner/operator but which might have a safety implication;
- c) understanding and mitigating the risks associated with the AMM, including any residual risks;
- d) using the AMM in accordance with the manufacturer's instructions;
- e) consulting with operators on potential machinery hazards and risks;
- f) implementing a system of maintenance;
- g) implementing safe working procedures;
- h) training farm and operator personnel in:
 - 1) safe operation/systems of work;
 - 2) maintenance procedures; and
 - 3) emergency procedures;
- i) developing and implementing health and safety awareness training for all personnel on site to make them aware of the hazards associated with using AMM; and
- j) recording, reporting, investigating incidents and using this information to take remedial and preventive action.

0.2.3 Designers and manufacturers

The responsibilities of designers and manufacturers include:

- a) determining the suitability and compatibility of AMM to farming operations;
- b) determining requirements for functional safety;
- c) establishing performance specifications;
- d) fulfilling the duties and obligations of designers and manufacturers as required by applicable legislation;
- e) compliance with current national or international standards;
- f) developing information and instructions to accompany the AMM with regard to:
 - 1) operating parameters/systems of work;
 - 2) risks and residual risks; and
 - 3) maintenance and servicing;
- g) providing assurance of certification-type testing (if applicable);
- h) monitoring field performance and incidents; and
- i) providing warranty and service support for owners and operators.

0.2.4 Importers and distributors

The responsibilities of importers and distributors include:

- a) fulfilling the duties and obligations of an importer or a distributor as required by applicable legislation;
- b) compliance with current national or international standards;
- c) participating in site risk assessments to determine the suitability of the proposed AMM;
- d) conveying to the distributor, owner and operator the information provided by the manufacturer; and
- e) providing warranty and service support for owners and operators.

0.3 AMM use cases

It is anticipated that AMM would be used to perform a wide range of tasks. This British Standard does not provide specific guidance for each use case.

NOTE – The user is advised to seek out the applicable regulations and standards.

Below is a non-exhaustive list of example use cases:

- a) driverless platforms;
- b) autonomous crop harvesting;
- c) autonomous weeding;
- d) autonomous spraying;
- e) autonomous planting;
- f) robotic livestock feeding; and
- g) autonomous slurry and manure handling.

1 Scope

This British Standard gives recommendations for the safe use of autonomous mobile machinery (AMM).

This British Standard is applicable to ground-based AMM in agriculture and horticulture, including controlled environment production in greenhouses and polytunnels.

This British Standard is aimed at owners and operators; however, it can also be of benefit to designers, manufacturers, importers and distributors.

It does not apply to:

- a) stationary machinery, for example greenhouse transplanting machines for which the plants are on a conveyor and transported to the machine;
- b) conventional manual non-automated or mechanically automated agricultural machinery;
- c) uncrewed aircraft systems (UAS), more commonly called drones;
- d) agricultural field machinery directly controlled by a human operator, whether that operator is located on the machine or in a remote location;
- e) autonomous machinery operating only on a mechanically fixed path;
- f) forestry machinery.

This British Standard does not cover the use of AMM on public roads.

2 Normative references

There are no normative references in this document.¹⁾

3 Terms and definitions

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

3.1 agriculture

science and art of cultivating the soil, growing and gathering in crops, and rearing of livestock

3.2 automated

technique, method or system of operating and controlling machine function(s) by automatic means

[SOURCE: ISO/DIS 18497-1:2022, 3.7]

3.3 autonomous

automated machine functions that operate throughout the machine's operating cycle

[SOURCE: ISO/DIS 18497-1:2022, 3.4, modified]

3.4 autonomous mobile machinery (AMM)

self-propelled machinery with autonomous functions

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.