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Earth-moving machinery — Quick couplers — Safety

Engins de terrassement — Attache rapide — Sécurité

ICS: 53.100

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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. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements*.

Introduction

This standard specifies design criteria for quick couplers related to assisting the operator in ensuring that an attachment is located in the right position on the quick coupler and that the engagement system is fully activated. While preparing the standard it was considered to what extent the state of the art allowed the further reduction of risks related to engagement procedures not being fully completed. In particular, it was considered carefully whether the use of sensors and associated control systems could be normatively required in order to ensure that those procedures were correctly completed. It was determined that the current state of the art did not allow such a mandatory requirement to be made. However, due to the continuing development of technology this possibility will be reviewed by ISO TC 127 periodically so that a revision to this standard can be initiated at the appropriate time. Nothing in this standard should be taken as discouraging the development of new technologies and new technical measures to reduce or remove risk.

This document is a type C standard as defined in ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this standard.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

Earth-moving machinery — Quick couplers — Safety

1 Scope

This International Standard specifies safety requirements for quick couplers used on earth-moving machinery as defined in ISO 6165.

2 Normative references

The following referenced documents are indispensable for the application 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 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 6165, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 6750, *Earth-moving machinery — Operator's manual — Content and format*

ISO 9244, *Earth-moving machinery — Machine safety labels — General principles*

ISO 20474-1:2008, *Earth-moving machinery — Safety — Part 1: General requirements*

3 Terms and definitions

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

3.1
quick coupler
device mounted on an earth-moving machine to allow the quick interchange of attachments

Note 1 to entry: Quick couplers are also commonly referred to under many different names, including "quick hitch" and "attachment bracket". For the purposes of this standard only the term "quick coupler" is used.

3.1.1
powered quick coupler
quick coupler where the movement of at least one part of the engagement and locking system is actuated by a power source (e.g. a hydraulic system or an electric motor)

3.1.2
manual quick coupler
quick coupler where the movement of the engagement and locking systems is actuated by human effort at the quick coupler itself

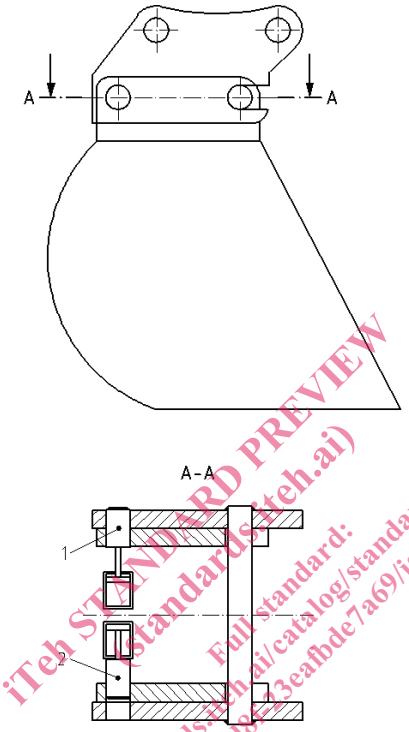
Note 1 to entry: Locking can be automatic as part of the manual process of engagement.

3.1.3
mixed quick coupler
quick coupler where engagement and locking are carried out from the operator's station but disengagement is carried out by human effort at the quick coupler itself

3.2
engagement system
mechanical system of the quick coupler which engages with the attachment and retains the attachment in its working position

3.2.1
form-locked engagement system
engagement system which retains the attachment in the normal working position by a system of at least two components that engage each other perpendicular to the working forces such that the working forces do not tend to cause disengagement

EXAMPLE Pin in shear (see Figure 1).

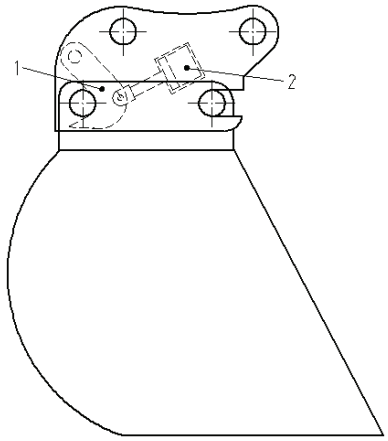


Key
1 engagement system in engaged position
2 engagement system in disengaged position

Figure 1 — Example of form-locked engagement system

3.2.2
force-locked engagement system
engagement system whereby continued engagement is dependent on the continuous application of the engagement force as the working forces act in a direction to cause disengagement

Note 1 to entry: See Figure 2 for an example.



Key

1 engagement system

2 engagement force device

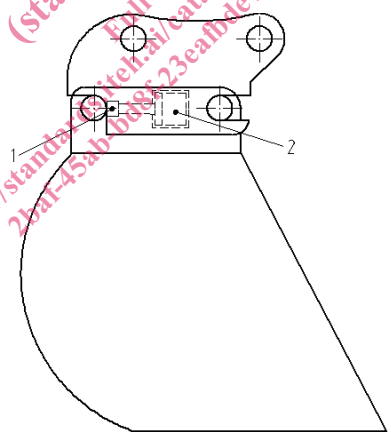
Figure 2 — Example of force-locked engagement system

3.2.3
friction system

engagement system whereby engagement is dependent on a force generated only by friction

Note 1 to entry: Friction engagement systems are not permitted [see 4.1.2 d)].

Note 2 to entry: See Figure 3 for an example.



Key

1 engagement system

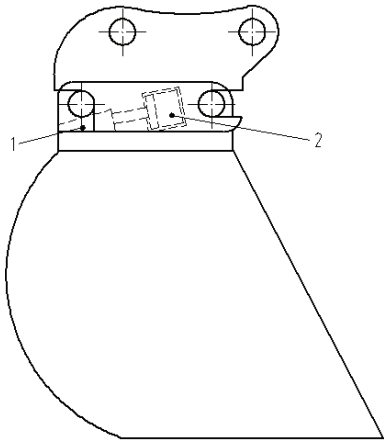
2 engagement force device

Figure 3 — Example of friction engagement system

3.2.4
wedge-type engagement system

engagement system of at least two interconnecting parts which engage with one another in a wedge action whereby the combination of the wedge angle and the friction coefficient counteract the tendency of the working forces to cause disengagement

Note 1 to entry: See Figures 4 and 5.

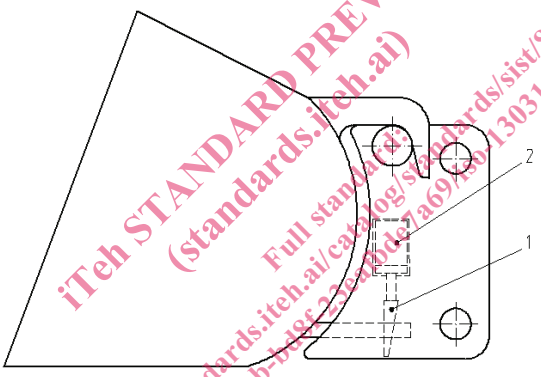


Key

1 engagement system (wedge)

2 engagement force device

Figure 4 — Example of wedge-type engagement system



Key

1 engagement system (wedge)

2 engagement force device

Figure 5 — Example of wedge-type engagement system on a loader

3.3
Forces

3.3.1
working forces

forces created by the working operations of the machine and attachments that act upon the quick coupler during intended use and reasonably foreseeable misuse

3.3.2
engagement force

force that moves the engagement system to the engaged position and, if the design requires, retains it in that position

Note 1 to entry: Engagement force can also be used for retention if the working force or additional forces (e.g. gravity) create a force tending to disengage the attachment (i.e. force-locked engagement systems, wedge-type engagement systems).