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**Safety of packaging machines –
Part 11: Determination of efficiency and availability;
English version EN 415-11:2021,
English translation of DIN EN 415-11:2021-12**

Sicherheit von Verpackungsmaschinen –
Teil 11: Ermittlung von Effizienz und Verfügbarkeit;
Englische Fassung EN 415-11:2021,
Englische Übersetzung von DIN EN 415-11:2021-12

Sécurité des machines d'emballage –
Partie 11: Détermination de l'efficacité et de la disponibilité;
Version anglaise EN 415-11:2021,
Traduction anglaise de DIN EN 415-11:2021-12

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In case of doubt, the German-language original shall be considered authoritative.

A comma is used as the decimal marker.

National foreword

This standard supersedes DIN 8743:2014-01.

This document (EN 415-11:2021) has been prepared by Technical Committee CEN/TC 146 “Packaging machines — Safety” (Secretariat: UNI, Italy).

The responsible German body involved in its preparation was *DIN-Normenausschuss Maschinenbau* (DIN Standards Committee Mechanical Engineering), Working Committee NA 060-18-27 AA “Efficiency and availability (national mirror committee for CEN/TC 146/WG 11)” of Section “Machinery intended for use with foodstuffs and feed and packaging machinery”. Representatives of manufacturers and users of packaging machines, and of the employers’ liability insurance associations contributed to this standard.

For current information on this document, please go to DIN’s website (www.din.de) and search for the document number in question.

Amendments

This standard differs from DIN 8743:2014-01 as follows:

- a) Annex E (informative) “Clarification of root-cause of incidents as prerequisite for the calculation of key-figures according to EN 415-11” has been added;
- b) the standard has been editorially revised.

Previous editions

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English Version

Safety of packaging machines - Part 11: Determination of efficiency and availability

Sécurité des machines d'emballage -
Partie 11: Détermination
de l'efficacité et de la disponibilité

Sicherheit von Verpackungsmaschinen -
Teil 11: Ermittlung
von Effizienz und Verfügbarkeit

This European Standard was approved by CEN on 23 August 2021.

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European foreword

This document (EN 415-11:2021) has been prepared by Technical Committee CEN/TC 146 “Packaging machines - Safety”, the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2022, and conflicting national standards shall be withdrawn at the latest by April 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

EN 415, Safety of packaging machines consists of the following parts:

- *Part 1: Terminology and classification of packaging machines and associated equipment;*
- *Part 2: Pre-formed rigid container packaging machines;*
- *Part 3: Form, fill and seal machines;*
- *Part 4: Palletisers and depalletisers;*
- *Part 5: Wrapping machines;*
- *Part 6: Pallet wrapping machines;*
- *Part 7: Group and secondary packaging machines;*
- *Part 8: Strapping machines;*
- *Part 9: Noise measurement methods for packaging machines, packaging lines and auxiliary equipment, grade of accuracy 2 and 3;*
- *Part 10: General requirements.*

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The operation of packaging machines and packaging lines is subject to numerous influences on the part of the machines and linking devices themselves, the upstream and downstream systems, the contents of the packaging, the packaging, the auxiliary packaging, the production organization, the service and maintenance personnel and the ambient conditions at the installation site. As a result, the packaging process is not disruption-free. During the operation of the packaging machine or packaging line, periods in which production takes place according to plan and to the required standard of quality stochastically interchange with periods in which disruptions lead to losses (e.g. due to scrap or production stoppages). This operating behaviour of a packaging machine or packaging line can be characterized by key figures, established from partial times on the basis of the structure of the machine working time and the output produced, or producible, during these periods.

This document defines a time model and an output model derived from this time model. These can be used to define general key figures and technical key figures for describing the operating behaviour of packaging machines and packaging lines. For this purpose, the technical key figures only take into consideration lost time and output losses that can be attributed to each packaging machine or packaging line examined.

Technical key figures are often based on agreed characteristics that are checked as part of an acceptance test. In practice, the system boundaries forming the basis of the acceptance test and that of the organizational and technical boundary conditions clearly influence the value determined for each key figure. This document specifies requirements for the proper performance of an acceptance test, the modalities of which should be agreed by the participating parties prior to the acceptance test being carried out.

The competence of the personnel responsible for the management of the packaging process plays an essential role.

Personnel (operators, maintenance people, quality staff) should be properly trained and be aware of the instruction provided by the manufacturer of the machine.

This document aims to promote mutual understanding between manufacturers and users of packaging machines and packaging lines with the respect to the use of terms and symbols (also referred as indicators) for the description of a packaging process.

The standard intends to enable the user of the standard to conduct a suitable test in which the operating conditions are correctly interpreted and attributed to shared causes.

For this reason, informative Annex D is offered which can be used with or without modifications in contractual specifications.