



SLOVENSKI STANDARD
SIST EN 13035-6:2007+A1:2010
01-februar-2010

Stroji in obrati za proizvodnjo, obdelavo in predelavo ravnega stekla - Varnostne zahteve - 6. del: Stroji za lomljenje

Machines and plants for the manufacture, treatment and processing of flat glass - Safety requirements - Part 6: Machines for break-out

Maschinen und Anlagen für die Herstellung, Be- und Verarbeitung von Flachglas - Sicherheitsanforderungen - Teil 6: Brechmaschinen

Machines et installations pour la production, le façonnage et la transformation du verre plat - Exigences de sécurité - Partie 6: Machines à rompre

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Ta slovenski standard je istoveten z: EN 13035-6:2006+A1:2009

ICS:

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SIST EN 13035-6:2007+A1:2010 en,fr

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EUROPEAN STANDARD

EN 13035-6:2006+A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2009

ICS 81.100

Supersedes EN 13035-6:2006

English Version

Machines and plants for the manufacture, treatment and processing of flat glass - Safety requirements - Part 6: Machines for break-out

Machines et installations pour la production, le façonnage et la transformation du verre plat - Exigences de sécurité - Partie 6: Machines à rompre

Maschinen und Anlagen für die Herstellung, Be- und Verarbeitung von Flachglas - Sicherheitsanforderungen - Teil 6: Brechmaschinen

This European Standard was approved by CEN on 24 May 2006 and includes Amendment 1 approved by CEN on 8 November 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 13035-6:2006+A1:2009) has been prepared by Technical Committee CEN/TC 151 “Construction equipment and building material machines — Safety”, the secretariat of which is held by DIN.

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 June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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

This document includes Amendment 1, approved by CEN on 2009-11-08.

This document supersedes EN 13035-6:2006.

The start and finish of text introduced or altered by amendment is indicated in the text by tags $\boxed{A_1}$ and $\boxed{A_1}$.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s).

$\boxed{A_1}$ For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. $\boxed{A_1}$

It is one of a series concerning machinery for the manufacture, treatment and processing of flat glass (see Bibliography).

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

EN 13035-6:2006+A1:2009 (E)

Introduction

This European Standard is a type C standard as stated in EN ISO 12100-1.

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

When provisions of this type C standard are different from those 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.

When compiling this European Standard it was assumed that:

- machines for break-out used in shops for the treatment of flat glass are compact and can be overlooked from the working place of the operator; but sometimes extended plants with remote parts are usual preferably in factories for the production of flat glass without the possibility of a survey from any position;
- transport, break-out of flat glass on the machinery generate no hazards by noise, but feeding waste glass into bins manually may make dangerous noise, when the glass is not placed with care but thrown off. Dangerous noise may also be generated by crushing waste glass or feeding waste glass into containers by conveyors near to the operator's working place so that wearing of ear plugs may be necessary;
- negotiations occur between the manufacturer and the user about measures to avoid dangerous noise at the operator's position by other sources, e.g. by separation and/or insulation of noisy operations, such as charging of waste glass into containers or crushing of waste glass;
- gas burners for naked flames used to induce stress to glass present no other significant hazards than burns by the flame, because burners have very low capacity, are used in big halls and are always in the operator's view so that automatic surveillance of the flame or specific ducts for exhaust are not usual and necessary;
- as far as applicable obstructions by the structure of guards during servicing work such as fault clearing are prevented by a minimum distance of 0,5 m between the guard and the machinery;
- the existing ad-hoc standards for components are applied, e.g. EN 619, EN 13035-3, EN 13035-5, when conveyors, cutting operations or unloading equipment are integrated.

1 Scope

1.1 This European Standard applies for machines for break-out of flat glass including the following steps: transport and positioning, break-out, transport of the cut sizes to the unloading position, leading away of waste flat glass.

1.2 A1 This European Standard deals with the significant hazards, hazardous situations and events relevant to machines for the break-out of flat glass when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4). A1 Those hazards which are dealt with in EN 619 for conveyors are excepted. A1 This European Standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards during commissioning, operation and maintenance. A1 Hazards from noise are not considered to be significant.

1.3 This European Standard is not applicable to the break-out operation (opening the cut) of cutting machines for laminated glass (see EN 13035-7).

1.4 This European Standard is not applicable to the treatment of waste flat glass such as crushing and/or charging of waste flat glass into bins, containers.

1.5 This European Standard does not apply to the significant hazards of conveyors. If there are specific hazards which arise by the co-operation of conveyors with machines for break-out of flat glass, appropriate measures are specified.

1.6 This European Standard is not applicable to machines for break-out of flat glass which are manufactured before the date of publication of this European Standard by CEN.

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2 Normative references

[SIST EN 13035-6:2007+A1:2010](http://www.standards.it/standards.it/standards/sist/6b2e9e2b-5555-4dff-a7a8-42aefb784dda/sist-en-13035-6-2007a1-2010)

<http://www.standards.it/standards.it/standards/sist/6b2e9e2b-5555-4dff-a7a8-42aefb784dda/sist-en-13035-6-2007a1-2010>

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.

A1 *deleted text* A1

EN 953:1997, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

A1 *deleted text* A1

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 999:1998, *Safety of machinery — The positioning of protective equipment in respect of approach speeds of parts of the human body*

EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up*

A1 *deleted text* A1

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EN 1760-2:2001, *Safety of machinery — Pressure sensitive protective devices — Part 2: General principles for the design and testing of pressure sensitive edges and pressure sensitive bars*

Ⓐ₁ EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)* Ⓐ₁

Ⓐ₁ EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)* Ⓐ₁

EN 61496-1:2004, *Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests (IEC 61496-1:2004, modified)*

Ⓐ₁ *deleted text* Ⓐ₁

Ⓐ₁ EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 11201, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995, including Cor 1:1997)*

EN ISO 11202, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method in situ (ISO 11202:1995)*

EN ISO 11204, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Method requiring environmental corrections (ISO 11204:1995, including Cor 1:1997)* Ⓐ₁

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

Ⓐ₁ EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)* Ⓐ₁

Ⓐ₁ EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)* Ⓐ₁

Ⓐ₁ CLC/TS 61496-2:2006, *Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) (IEC 61496-2:2006)* Ⓐ₁

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and the following apply.

3.1 break-out
method to open a cut (score) by generating strain e.g. by mechanical devices, by local heating with gas burners

3.2**static break-out**

process to divide flat glass while the glass rests on a horizontal supporting surface e.g. break-out table

3.3**dynamic break-out**

process to divide flat glass while the glass is moving on a horizontal supporting surface

3.4**automatic (mode)**

break-out process carrying out of the following procedures without intervention of persons: transport and positioning of the sheet; break-out e.g. by rolls, break-out bar; transport of divided glass to the unloading position (discharge of waste flat glass)

3.5**semi-automatic (mode)**

break-out process where some of the operations of the break-out process are controlled by a manual start

3.6**clamp (bar)**

device to hold down the glass from above against a supporting surface e.g. table

3.7**break-out bar**

long rectangular rod which moves upwards from below the supporting surface to lift and divide the scored flat glass

3.8**plunger**

tool which applies a vertical force to the glass from above

3.9**top rollers**

wheels which contact the flat glass from above to move the glass by friction or to generate strain to the glass for opening the cut

4 List of significant hazards

This clause contains the hazards, hazardous situations and events, as far as they are dealt with in this European Standard, identified by risk assessment as significant for machines for break-out of flat glass and which require action to eliminate or reduce the risk.

Before using this European Standard, it is important to carry out a general risk assessment of the machine in question.

Table 1 — List of significant hazards

A1

Hazards		Danger zone/dangerous item	Preventive measures: see clause
4.1	Static break-out		
4.1.1	Crushing of the fingers	upwards and downwards moving break-out bar/supporting surface, e.g. table	5.2.1

Table 1 (continued)

Hazards		Danger zone/dangerous item	Preventive measures: see clause
4.1.2	Crushing of hand or fingers	clamping device/supporting surface, e.g. table	5.2.2
4.1.3	Crushing of hand (fingers)	downwards moving plunger/glass to be broken	5.2.2
4.2	Dynamic break-out		
4.2.1	Drawing-in of hand or fingers	top roller/glass surface	5.3.1
4.3	General requirements		
4.3.1	Electrical	direct or indirect contact	5.4.4; 5.4.5; 7.2.7
4.3.2	Burns	naked flames	5.4.1; 7.2.6
4.3.3	Neglecting ergonomic principles; human behaviour	all dangerous movements and items, fixed guards fixing systems	7.2.4; 5.7
4.3.4	Unexpected overrun by failure of the control system	flat glass falling from the supporting surface by non stopping of conveyors delivering glass to manual unloading stations	5.4.2
4.3.5	Unexpected start-up from disorder of the control system, error of the operator, restoration of energy supply after interruption	all dangerous movements	5.4.4 to 5.4.6; 7.2.7; 7.2.8
4.3.6	Impossibility of stopping in the best possible conditions	all dangerous movements, naked flames	5.4.7; 7.2.9
4.3.7	Falling or ejected objects	collision of sheets of glass and pushing off sheets from supporting surface	5.4.3
4.3.8	Slip	glass bits	7.2.5
4.4	Conveyor		
4.4.1	Crushing	flap/fixed parts of conveyors	5.5.2
4.4.2	Cutting	flat glass e.g. projecting the outline of the conveyor	5.5.1; 7.2.3

5 Safety requirements and/or protective measures

5.1 General

Machinery shall comply with the safety requirements and/or protective measures of this clause.

In addition, the machine shall be designed according to the principles of EN ISO 12100 for hazards relevant but not significant which are not dealt with by this European Standard (e.g. sharp edges).

For applications of a B-level standard such as A_1 EN ISO 13850 A_1 , EN 953, A_1 EN ISO 13849-1 A_1 , EN 982, EN 983, EN 999, EN 1037 and EN 60204-1, the manufacturer shall carry out an adequate risk assessment for the requirements thereof where choice is necessary. This specific risk assessment is part of the general risk assessment relating to the hazards not covered by this European Standard.

Where the means of reducing the risk is by the arrangement of the installed machine or by a safe system of work, the manufacturer shall include in the information for use a reference to the reduction means to be provided, including training, and to any limiting value of the requirement and if appropriate to the means of verification.

5.2 Static break-out

5.2.1 The design of the break-out bars shall be such that during lifting of the bars, no opening is created between the lower side of the bars and the supporting surface.

5.2.2 Clamps e.g. bars holding down the glass and plungers shall be safeguarded to exclude the risk of crushing of hand or fingers e.g. by: [\(standards.iteh.ai\)](https://standards.iteh.ai/)

5.2.2.1 A closing movement of maximum 6 mm, or

5.2.2.2 A_1 low-pressure approach so that the closing force of the clamp or plunger does not exceed 150 N until the clamp (bar) or plunger has moved up to 6 mm or less of the surface of the glass so that fingers cannot get under the bar or plunger; the related parts of the control system shall as a minimum comply with performance level c in accordance with EN ISO 13849-1:2008, or

5.2.2.3 low-pressure approach with a closing force not exceeding 150 N and with a minimum two seconds' delay before working pressure is applied; the related parts of the control system shall as a minimum comply with performance level c in accordance with EN ISO 13849-1:2008, or A_1

5.2.2.4 Fixed covers with a vertical gap (opening) of maximum 25 mm to the supporting surface (table) and a horizontal distance from the crushing point of minimum 60 mm to avoid accidental access, or

5.2.2.5 A_1 sensitive protective equipment, for example a sensitive bar or an opto-electronic protective device (light beam) close to the clamping bar or plunger. Sensitive bars shall comply with EN 1760-2:2001 and shall as a minimum comply with performance level c in accordance with EN ISO 13849-1:2008. Opto-electronic protective devices shall be of type 4 in compliance with EN 61496-1:2004 and CLC/TS 61496-2:2006, with a maximum detection capacity of 14 mm, or

5.2.2.6 at sides where operational access is not intended, a perimeter fence in accordance with EN ISO 13857:2008, Tables 1 and 4, but with a minimum height of 1,40 m and a minimum horizontal distance between the fence and the nearest danger zone of 0,5 m. Provisions shall be made for access to the machinery, while the access openings shall be safeguarded by interlocking doors or guard, or by single beam opto-electronic protective devices.

The interlocking devices for doors or guards shall as a minimum comply with performance level d in accordance with EN ISO 13849-1:2008.