BS ISO 23013:2016

BSI Standards Publication

Road vehicles — Determination of resistance to forced entry of security glass constructions used in vehicle glazing — Test of glazing systems

bsi.

...making excellence a habit.™

AVA Document Sharing Hub

Full document details: BS ISO 23013:2016

National foreword

This British Standard is the UK implementation of ISO 23013:2016.

The UK participation in its preparation was entrusted to Technical Committee AUE/1, Vehicle lighting and signalling.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016.
Published by BSI Standards Limited 2016

ISBN 978 0 580 81666 6

ICS 43.040.65

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2016.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO 23013:2016

INTERNATIONAL STANDARD

ISO 23013

First edition
2016-01-15

Road vehicles — Determination of resistance to forced entry of security glass constructions used in vehicle glazing — Test of glazing systems

Véhicules routiers — Détermination de la résistance à la force d'intrusion des constructions de vitres de sécurité utilisées dans les vitrages de véhicules — Essai des systèmes de vitrages

Reference number
ISO 23013:2016(E)

Documents
Document Sharing Hub

© ISO 2016

Full document details: BS ISO 23013:2016

COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO 23013:2016

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Principle ... **3**
5 Apparatus ... **4**
5.1 Description of the apparatus ... 4
5.1.1 General ... 4
5.1.2 Tool for pointed attack ... 6
5.1.3 Tool for blunt attack ... 7
5.1.4 Tool for cutting attack ... 7
5.1.5 Tool for displacement test ... 8
5.2 Checking the equipment ... 10
5.2.1 Determining the effective mass and checking the speed measuring apparatus ... 10
5.2.2 Pointed attack ... 11
5.2.3 Blunt attack ... 11
5.2.4 Cutting attack ... 11
5.2.5 Displacement test ... 11
6 Test pieces ... **12**
6.1 Support frame for the system part ... 12
6.2 Associated sections of the car body ... 12
6.3 Security glazing ... 12
6.4 Number of panes of glazing ... 13
7 Test conditions ... **13**
8 Test procedures ... **13**
8.1 General ... 13
8.2 Attack test sequence with blunt tool ... 14
8.2.1 General ... 14
8.2.2 Test element pointed attack ... 14
8.2.3 Test element blunt attack ... 14
8.2.4 Test element displacement ... 14
8.2.5 Test position and requirements for different levels of attack resistance ... 14
8.3 Attack test sequence with cutting tool ... 15
8.3.1 General ... 15
8.3.2 Test element pointed attack ... 16
8.3.3 Test element cutting attack ... 16
8.3.4 Test element displacement ... 16
8.3.5 Test position and requirements for different levels of attack resistance ... 16
9 Classification ... **18**
10 Test report ... **18**
11 Test certificate ... **19**
Annex A (informative) **Comments** ... **20**
Annex B (informative) **Source of steel pin for the pointed attack tool** ... **21**
Bibliography ... **22**

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 23013:2016

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 22, *Road vehicles*, Subcommittee SC 35, *Lighting and visibility*.

© ISO 2016 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 23013:2016

Introduction

The vast majority of potential attacks using hand-held implements can be narrowed down to two basic types of attack: attack with a sharp instrument and attack with a blunt instrument. Such attacks are reproduced by these procedures using standardized tests. The levels of energy/force used in the tests are designed to reflect strength of attack that is within the limits of human capability.

As the construction of the window frame plays a particularly important role in providing resistance to forced entry, any glazing requiring classification approval by this International Standard needs to be tested within its own original car body section, e.g. its own door assembly.

By defining performance levels of attack resistance, it is possible to classify the intruder resistance properties of a given glazing within a system part.

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 23013:2016

Documents
Document Sharing Hub

Full document details: BS ISO 23013:2016

INTERNATIONAL STANDARD ISO 23013:2016(E)

Road vehicles — Determination of resistance to forced entry of security glass constructions used in vehicle glazing — Test of glazing systems

1 Scope

This International Standard provides test procedures that are designed to assess levels of resistance to forced entry provided by security glazing used in vehicles. Security glazing to be tested shall provide a certain (higher) level of protection against vehicle intrusion than standard safety glazing. This International Standard does not apply to conventional safety glazing material that meets the requirements of international automotive glazing material standards similar, but not limited to ECE R43.

This International Standard's goal is to quantify how much resistance can be provided by particular system parts (security glazing with associated part of the car body) against rapid unauthorized entry into vehicles. The test methods used have been designed more to simulate opportunist theft attacks using simple implements, which could be easily carried about a person rather than by "calculated theft" using specialist tools which a professional thief might use. That range of tools is limited to hand-held and non-powered instruments that could physically provide access to a vehicle.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 513, *Classification and application of hard cutting materials for metal removal with defined cutting edges — Designation of the main groups and groups of application*

ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

ISO 4130, *Road vehicles — Three-dimensional reference system and fiducial marks — Definitions*

EN 10027-2, *Designation systems for steels — Part 2: Numerical system*

DIN 5131, *Hatchets*

DIN 7287, *Steel axes and hatchets — Technical specifications*

DIN 53479, *Testing of Plastics and Elastomers; Determination of Density*

3 Terms and definitions

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

3.1
attack test
predetermined series of blows to a specific area of a *system part* (3.13) applied with well-defined energy levels and a *standardized tool* (3.12)

3.2
blunt attack
attempt to break into a vehicle where the energy of attack is exerted onto the *system part* (3.13) by a blunt or rounded impacting tool

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 23013:2016

3.3
cutting attack
attempt to break into a vehicle where the energy of attack is exerted onto the *system part* (3.13) by a tool with a sharp cutting edge

3.4
displacement test
test to evaluate the level of retention of glazing within its frame or the associated car body using a spherical-faced tool constantly moved against the inside centre of the glazing until a well-defined level of force is reached

3.5
effective mass
mass of a freely moving implement that, driven by the same kinetic energy, would hit the *system part* (3.13) with the same speed as the *effective tool* (3.6) implemented in the test apparatus

Note 1 to entry: Implements with the same effective mass and with same kinetic energy will develop same speed; kinetic energy and speed are the fixed parameters to study interaction between *standardized tool* (3.12) and system part. For technical reasons, additional construction elements are required moving with the standardized tool affecting the relationship between kinetic energy and speed. A procedure is given to measure the effective mass for a given design and facilitate countermeasures.

Note 2 to entry: The effective mass is calculated out of measurement results from a drop test using the effective tool's gravitational force, the stroke height, and the speed at the *impact point* (3.8) as shown in 5.2.

3.6
effective tool
mechanical unit consisting of the standardized tool and all moving parts attached to it

Note 1 to entry: During the entire test procedure, only the *standardized tool* (3.12) itself shall come into contact with the *system part* (3.13).

3.7
forced entry testing
standardized test procedure in two parts (*attack test* (3.1) sequence with blunt tool and attack test sequence with cutting tool) to assess the resistance of glazing within a given part of a car body against forced entry

3.8
impact point
location on the *standardized tool* (3.12) at which first contact to the *system part* (3.13) is made during the *attack test* (3.1)

3.9
level of attack resistance
measure in five discrete steps of the ability of a *system part* (3.13) to resist a forced entry of a certain strength specified by the number of tool impacts, their energies, and forces for displacement

Note 1 to entry: For higher levels of attack resistance, a larger number of impacts as well as higher energies and forces are required.

Note 2 to entry: If a system part passes the *forced entry testing* (3.7) as described, then the system part meets the requirements of the specific level of attack resistance for which it was tested. If the results for the *attack test* (3.1) sequences with cutting and blunt tool are different, the overall test evaluation will correspond to the lower level of the two results.

© ISO 2016 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 23013:2016

3.10
pointed attack
attempt to break into a vehicle where the energy of attack is exerted onto the *system part* (3.13) by a pointed tool

Note 1 to entry: Pointed attack can cause the glazing to crack or to develop full, localized penetration of the glass pane.

3.11
resistance to forced entry
ability of a glazing to resist the attempt to penetrate glazing using simple tools

Note 1 to entry: The strength of resistance will be quantified by use of distinct levels called levels of attack resistance.

Note 2 to entry: This property is only appropriate for the *system part* (3.13) under test using standardized conditions and does not take into account all aspects necessary to evaluate resistance to forced entry of a complete vehicle. For example, location of glazing in the vehicle or strategy of the attack could affect this property and are out of the scope of this International Standard.

3.12
standardized tool
testing device that simulates forced entry by cutting, pointed, and *blunt attack* (3.2)

Note 1 to entry: Each device aims to represent a respective category of tools that could potentially be used for forced entry into a vehicle.

3.13
system part
original security glazing and the associated part of the car body (e.g. the window pane and door of a given vehicle)

3.14
test element
part of the *attack test* (3.1) sequence referring to an attack test using one of the *standardized tools* (3.12)

3.15
tool axis
construction line that passes through the tool's *impact point* (3.8) and is in line with the direction of movement immediately before it hits the system part (direction of action)

3.16
tool's direction of action
direction in which the tool is moving immediately before it hits the *system part* (3.13)

Note 1 to entry: If the tool is following a circular path, the direction of action is the tangent to the circular path at the *impact point* (3.8), immediately before tool applies force to the system part.

4 Principle

A wide range of attacks using various hand-held tools will be simulated by only two different test procedures applied to the same kind of system part. The results of both tests will be taken to generate a classification of resistance to forced entry by the use of levels of attack resistance.

Both test procedures, called "attack test sequence with blunt tool" and "attack sequence with cutting tool" cover three test elements, each applied to the same kind of system part, representing all relevant elements of a forced entry with handheld tools.

In a first step of an attack test sequence, the glazing is impacted by a pointed tool. This reflects the attempt to destroy the integrity of the brittle glazing component(s) for a forced entry as a first step,

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 23013:2016