

CEN

CWA 16221

WORKSHOP

October 2010

AGREEMENT

ICS 93.080.30

English version

Vehicle security barriers - Performance requirements, test methods and guidance on application

This CEN Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

The formal process followed by the Workshop in the development of this Workshop Agreement has been endorsed by the National Members of CEN but neither the National Members of CEN nor the CEN Management Centre can be held accountable for the technical content of this CEN Workshop Agreement or possible conflicts with standards or legislation.

This CEN Workshop Agreement can in no way be held as being an official standard developed by CEN and its Members.

This CEN Workshop Agreement is publicly available as a reference document from the CEN Members National Standard Bodies.

CEN members are the national standards bodies of 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

age

Foreword.....	5
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 General.....	11
4.1 Selection of test method	11
4.2 Documentation.....	11
4.3 Profile.....	11
4.4 Test conditions	12
4.4.1 General.....	12
4.4.2 Conformity between test item and documentation	12
4.4.3 Impact point.....	12
4.4.4 System operation.....	12
5 Vehicle impact method.....	13
5.1 Classification.....	13
5.2 Test vehicle specification	14
5.3 Test impact criteria.....	16
5.4 Performance requirements	16
5.5 Test method.....	17
5.5.1 Principle.....	17
5.5.2 Apparatus	17
5.5.3 Pedestrian intruder access.....	20
5.5.4 Test facility	20
5.5.5 Test item preparation	21
5.5.6 Test vehicle preparation	21
5.5.7 Occupant severity indices (optional).....	22
5.6 Test procedure.....	23
5.6.1 Pre-impact data.....	23
5.6.2 Impact	23
5.6.3 Impact data.....	23
5.6.4 Post-impact data	24
5.6.5 Post-impact vehicle encroachment data.....	28
5.6.6 Post-impact person access data.....	28
5.6.7 Further impact tests	28
5.7 Test report	28
6 Design method	29
6.1 Classification.....	29
6.2 Design criteria.....	29
6.3 Design procedure	30
6.4 Design data.....	30
Annex A in normative Alternative methods of testing single bollards at low impact energy.....	31
Annex B normative Modifications.....	32
Annex C normative Generic rigid test foundation for a single fixed bollard for vehicle impact tests.....	34
Annex D in normative Introduction to hostile vehicle mitigation	37
D.1 General.....	37
D.2 Selection of a VSB	38

Annex E Informative The threat	39
E.1 Identify and quantify the threat.....	39
E.2 Duration of deployment	39
Annex F Informative The assets	41
F.1 Identification of the critical assets	41
F.2 Identification of stakeholders	41
F.3 Consideration of collateral damage	41
Annex G Informative Site assessment	42
G.1 Review of existing security arrangements	42
G.2 Site survey	42
G.3 Civil works.....	42
G.3.1 Ground types	42
G.3.2 Foundations.....	43
G.3.3 Surface mounted VSB.....	43
G.4 Traffic survey.....	43
Annex H Informative Site design	44
H.1 Traffic management	44
H.2 Aesthetics.....	45
Annex I Informative VSB performance	46
I.1 Impact performance	46
I.1.1 General	46
I.1.2 Vehicle type.....	46
I.1.3 Vehicle speed.....	46
I.1.4 Impact angle.....	47
I.1.5 Vehicle penetration and dispersion.....	47
I.2 Operational performance.....	48
I.2.1 Vehicle access control.....	48
I.2.2 Speed of legitimate access.....	48
I.2.3 Power requirement	48
I.2.4 Durability and reliability.....	49
I.2.5 Environmental considerations	49
I.2.6 VSB integrity	49
I.2.7 Staff, skills and availability.....	50
Annex J Informative Procurement strategy	51
J.1 General	51
J.2 Availability and maintenance of the VSB.....	51
J.3 Quality.....	51
J.4 Cost.....	51
J.5 Commissioning and handover	52
Annex K Informative Deployment and removal	53
K.1 Highway/local authority approval	53
K.2 Logistics of deployment	53
K.3 Setting out.....	53
K.4 Lifting and placement issues	53
K.5 Removal considerations	53
Annex L Informative Types of VSBs	54
L.1 General	54
L.1.1 Passive VSBs.....	54
L.1.2 Active VSBs	54
L.2 Examples of passive VSBs.....	55
L.2.1 Fixed bollards	55
L.2.2 Planters.....	55
L.3 Examples of active VSBs.....	56
L.3.1 General	56
L.3.2 Rising bollards.....	56
L.3.3 Road blockers.....	57

L.3.4	Rising arm barriers	58
L.3.5	Sliding and swing gates	59
Annex M	Informative Active VSBs	61
M.1	General	61
M.2	Categories of active VSBs	62
M.2.1	General	62
M.2.2	VACP	62
M.2.3	Anti-ram VSB	62
M.2.4	Counter-terrorist VSB	62
M.3	Layout of active VSBs at VACPs	62
M.3.1	General	62
M.3.2	Single line of VSBs	63
M.3.3	Interlocked VSBs	64
M.3.4	Final denial VSB	65
M.3.5	Traffic throughput	66
M.4	Safety issues	66
M.5	Training	68
M.6	Maintenance, service and inspection	68
M.7	Control system	68
Annex N	Informative Operational requirements	70
N.1	General	70
N.1.1	Introduction	70
N.1.2	Level 1 OR	70
N.1.3	Level 2 OR	72
N.2	Level 2 OR proforma	73
N.2.1	Document references	73
N.2.2	Level 1 OR references	73
N.2.3	Level 2 OR references	74
N.2.4	Area of concern	75
N.2.5	Period of Concern	76
N.2.6	Vulnerabilities	77
N.2.7	HVM measure(s) function	81
N.2.8	Performance requirements - Modus Operandi (MO)	82
N.2.9	Impact and performance requirement (hostile vehicle)	83
N.2.10	Performance requirement (normal operation)	84
N.2.11	Physical constraints	86
N.2.12	Environment constraints	87
N.2.13	Rules and regulations	88
N.2.14	Success criteria	89
N.2.15	Integration	90
N.2.16	Management	91
N.2.17	Service and maintenance	92
Annex O	(Informative) Proforma test report	93
O.1	Impact test report	93
O.2	Contents of report	93
Bibliography		94

Foreword

The production of this European Standard specifying *Vehicle security barriers — Performance requirements, test methods and guidance on application* was formally accepted at the European meeting on June

The document has been developed through the collaboration of a number of contributing partners in this European Standard representing the interest of industry, academics, Standard bodies, government bodies and research establishments.

This document has received the support of representatives of the following organizations:

- AT Security Systems, Austria
- Attorney General's Department, Australian Government
- Eoba Limited, incorporating E
- Riform, Ireland
- Centre for the Protection of National Infrastructure, UK
- E.T. Europa, mb, E
- Devon County Council
- French Home and Security Technical Centre, France
- Fundación CIDAUT, Spain
- Unnebo, Sweden
- Eras, E, S
- Laboratoire des essais nrets Équipements de la route, E
- Vannac, ip, ty, td, V
- International, td
- Ministry of Defence, UK
- td
- National Advisory Centre for the Critical Infrastructure, V
- ewgate, ewar, td, E
- Norwegian Defence Estates Agency, E
- Perimeter Security Suppliers Association, SS

- Rodney Oate Security Adviser S
- Technica and Test Institute for Construction Rague T S raha
- Te as Transportation Institute T
- Transport Research Laboratory T
- S epartment o State oS

The orma process o owed by the or shop in the deve opment o the E or shop greement has been endorsed by the ationa embers o E but neither the ationa embers o E nor the E – E E E anagement entre can be held accountable or the technica content o the E or shop greement or possible conflict with standards or egislation This E or shop greement can in no way be held as being an official standard developed by E and its members

The ina review endorsement round or this was started on and was successfully closed on The ina te to this was submitted to E or publication on

This E or shop greement is publicly available as a reference document from the ationa embers o E E S S S E T EVS ST VS ST S S T E S SEE S S S ST S S S S V S T and

omments or suggestions from the users of the E or shop greement are welcome and should be addressed to the E E E E anagement entre

Product testing. sers o this are advised to consider the desirability o third party testing o product conformity with this appropriate conformity attestation arrangements are described in E S E enera re urements or the competence o testing and calibration laboratories sers seeing assistance in identifying appropriate conformity assessment bodies or schemes may as S or any ationa Standards ody in Europe to orward their en uiries to the relevant association roducts that have been tested to the re urements o S S and have been approved are deemed to satisfy and be approved to the re urements o E and will be classied accordingly

Introduction

This European shop agreement has been prepared to address the needs of organisations who wish to have assurance that vehicle security barriers (VSBs) will provide the level of impact resistance which is sought.

Many systems are available that are either promoted or considered suitable for use as VSBs. As their characteristics differ in both function and form, a comparative means of assessing their performance is required.

This document identifies impact test methods, test vehicle type and performance criteria that need to be met in order to conform to it.

This document also provides guidance on the selection, installation and use of VSBs to ensure that they are selected and placed as effectively as possible. This document is intended to be used by designers, planners, architects, security managers and facilities managers within the public and private sectors.

The guidance highlights the issues to be addressed when considering the use of traffic calming and VSBs as part of an overall security regime. The topics considered are by no means exhaustive and the user is encouraged to consider additional questions and responses to cater for specific issues.

Any changes are subsequently proposed to the security package that has been designed for a site, decisions based on this should be used to confirm why the original security decisions were made and how they will be affected by any changes. Decisions should be recorded and records retained for audit purposes and periodic review.

VSBs, by virtue of their basic design, may not be intended to provide any blast resistance but may be affected by any explosives that detonate, causing the impact or arrest of a hostile vehicle, despite providing valuable standoff distance to an asset. VSBs may add to secondary fragmentation created by an explosion and specialists should identify acceptable levels of risk. See Annex A and

VSB installation, particularly at a vehicle access control point. VSBs may need to be integrated with TV security lighting, perimeter intruder detection systems, automatic access control systems, physical delay measures and security procedures including guarding regimes. In order to achieve an integrated security solution, it is imperative from the outset to define the performance requirements and interfaces between these systems. This is where security operational requirements add significant value to the installation and commissioning process and lifecycle management.

Annex B describes in more detail the process of producing operational requirements.

1 Scope

This specifies a classification system for the performance of a vehicle security barrier (VS) when subjected to a single horizontal impact.

This specifies two methods for determining the performance classification of a VS:

- the vehicle impact method for all types of VSs using a test vehicle classified in accordance with Directive 2002/22/EC and registered for use in Europe
- the design method for all types of VSs

This refers to alternative test methods for determining the performance classification of a VS (see Annex A).

This also provides guidance on the selection, installation and use of VSs (see Annex B).

This also describes the process of producing "operational requirements" (see Annex C).

This does not cover the performance of a VS or its control apparatus when subjected to:

- blast exposure
- ballistic impact
- manual attack with the aid of tools including vehicles

For manual attack, attention is drawn to EN 16221-2 which covers test methods for assessing burglar resistance of building components such as doors, windows, shutters, grilles, strong points and security enclosures.

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.

EN 12530 Road restraint systems – Part 1: Terminology and general criteria for test methods

EN 1992 Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings

EN 12390 Testing hardened concrete – Part 2: Making and curing specimens for strength tests

3 Terms and definitions

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

3.1

ballast

mass securely fixed to the vehicle