

# DIN EN 1645-1:2018-06 (E)

## Leisure accommodation vehicles - Caravans - Part 1: Habitation requirements relating to health and safety

---

<b>Contents</b>		<b>Page</b>
European foreword .....		6
Introduction .....		7
1	Scope .....	8
2	Normative references .....	8
3	Terms and definitions .....	8
4	Testing .....	9
5	Design and construction .....	9
5.1	Occupancy .....	9
5.2	Rigidity .....	9
5.3	Corner steadies .....	9
5.4	Grab handles .....	9
5.5	Entrance steps .....	10
5.5.1	Heights .....	10
5.5.2	Minimum tread dimensions .....	10
5.5.3	Mechanical strength .....	10
5.5.4	Slip resistance test .....	10
5.6	Doors .....	10
5.6.1	Dimensions .....	10
5.6.2	Securing doors .....	11
5.7	Awning Rail .....	11
6	Internal equipment .....	11
6.1	Bunks .....	11
6.1.1	Mattress and/or upholstery .....	11
6.1.2	Clearance .....	11
6.1.3	Protection against falling out .....	11
6.1.4	Mechanical strength .....	12
6.1.5	Security of bunks .....	12
6.1.6	Access to high level bunks .....	12
6.1.7	Protection against entrapment .....	12
6.2	Cupboards .....	13
6.3	Cooking appliance .....	13
7	Drinking water supply, storage and disposal of waste water .....	13
7.1	Couplings for drinking water supply .....	13
7.2	Drinking water .....	13
7.2.1	Tanks .....	13
7.2.2	Materials .....	13
7.2.3	Marking .....	13
7.3	Waste water disposal tank .....	13
7.4	Toilet waste disposal .....	13
7.4.1	Discharge systems .....	13
7.4.2	Outlets and couplings from toilet waste holding tanks .....	14
8	Appliances .....	14

8.1	Installation of appliances .....	14
8.2	Restriction concerning the supply of appliances .....	14
9	Classification of thermal insulation and heating .....	14
10	Installations .....	15
10.1	Electricity .....	15
10.1.1	Low voltage .....	15
10.1.2	Extra low voltage .....	15
10.2	Liquefied petroleum gas (LPG) .....	15
10.3	Liquid fuel .....	15
11	Ventilation .....	15
12	Fire precautions .....	15
12.1	Means of escape .....	15
12.1.1	Emergency exits .....	15
12.1.2	Escape path .....	15
12.1.3	Sanitation compartments .....	16
12.1.4	Emergency doors .....	16
12.1.5	Interior doors .....	16
12.1.6	Emergency windows and emergency panels .....	16
12.1.7	Work surfaces .....	18
12.1.8	Heating and cooking equipment .....	18
12.2	Protection of flammable elements .....	18
12.2.1	Rigid or guided elements .....	18
12.2.2	Non-guided elements .....	19
12.3	Hotplates .....	19
13	Warning notice .....	19
13.1	Provision of warning notice .....	19
13.2	Content of warning notice .....	20
14	User's handbook .....	20
Annex A (normative) Rigidity test (see 5.2) .....		22
A.1	Principle .....	22
A.2	Preparation and procedure .....	22
A.3	Expression of results .....	22
A.4	Test report .....	22
Annex B (normative) Grab handle test (see 5.4) .....		23
B.1	Principle .....	23
B.2	Preparation and procedure .....	23
B.3	Expression of results .....	24
B.4	Test report .....	24
Annex C (normative) Strength of Entrance Steps (see 5.5.3) .....		25
C.1	Principle .....	25
C.2	Preparation and procedure .....	25
C.3	Expression of results .....	25
C.4	Test report .....	26
Annex D (normative) Slip resistance test (see 5.5.4) .....		27
D.1	Principle .....	27
D.2	Preparation and procedure .....	27
D.3	Expression of results .....	28

D.4	Test Report .....	28
Annex E (normative) Separate entrance step stability test (see 5.5.4.2) .....		29
E.1	Principle .....	29
E.2	Preparation and procedure .....	29
E.3	Expression of results .....	30
E.4	Test report .....	30
Annex F (normative) Clear height over bunks (see 6.1.2) .....		31
F.1	Principle .....	31
F.2	Preparation and procedure .....	31
F.3	Expression of results .....	31
F.4	Test report .....	31
Annex G (normative) Strength of protection against falling out of bunks (see 6.1.3) .....		32
G.1	Principle .....	32
G.2	Preparation and procedure .....	32
G.3	Expression of results .....	32
G.4	Test report .....	32
Annex H (normative) Mechanical strength of bunks (see 6.1.4) .....		33
H.1	Principle .....	33
H.2	Selection of bunk .....	33
H.3	Preparation and procedure .....	33
H.4	Expression of results .....	33
H.5	Test report .....	33
Annex I (normative) Security of folding bunks (see 6.1.5) .....		34
I.1	Principle .....	34
I.2	Preparation and procedure .....	34
I.3	Expression of results .....	34
I.4	Test report .....	34
Annex J (normative) Safety of access to high level bunks (see 6.1.6) .....		35
J.1	Principle .....	35
J.2	Preparation and procedure .....	35
J.2.1	General .....	35
J.2.2	Attachment and deflection .....	35
J.3	Expression of results .....	35
J.4	Test report .....	35
Annex K (normative) Measurement of gaps (see 6.1.7) .....		37
K.1	Cone measuring device .....	37
K.2	Gaps in the base structure .....	37
K.3	Measurement of gaps .....	38
Annex L (normative) Thermal insulation - Method of calculation (see Clause 9) .....		39
L.1	Explanation of terms used .....	39
L.1.1	Thermal transmittance, U .....	39
L.1.2	Thermal conductivity, .....	39
L.1.3	Thermal resistance, R .....	39
L.1.4	Surface resistance, R <sub>si</sub> and R <sub>se</sub> .....	39
L.2	Objectives of calculation .....	40

L.3	Method of calculation .....	40
L.3.1	General .....	40
L.3.2	Calculation of R1, R2, R3 .....	41
L.3.3	Calculation of thermal transmittance for one caravan wall, $U_w$ .....	42
L.3.4	Calculation of overall thermal transmittance of caravan, $U_e$ .....	42
L.3.5	Losses of heat via the walls, $kw$ .....	43
L.3.6	Losses of heat due to renewal of air, $kv$ .....	43
L.3.7	Rated power of heating appliances, $P$ .....	43
L.3.8	Temperature .....	43
<b>Annex M (normative) Determination of the thermal transmittance for caravans --Test method (see Clause 9) .....</b>		<b>45</b>
<b>Annex N (normative) Test equipment .....</b>		<b>47</b>
N.1	General .....	47
N.2	Load measuring cell .....	47
N.3	Load measuring cell .....	47
N.4	Certified weights .....	47
N.5	Load spreading platform .....	47
N.6	Load spreading platform .....	47
N.7	Step testing device .....	47
N.8	Flexible load spreading device .....	48
N.9	Step testing plate .....	48
N.10	Friction test piece .....	49
N.11	Ball .....	49
N.12	Cone measuring device .....	49
<b>Annex O (informative) Environmental aspects .....</b>		<b>50</b>
<b>Bibliography .....</b>		<b>51</b>