



# ACBFA2D5

## E-FORCE AB

# PRODIS-GUT Certificate

The article mentioned meets the test criteria of  
Gemeinschaft umweltfreundlicher Teppichboden e.V.

### Short description of the textile floor covering

Type of production: pile carpet acc. EN 1307:2014 - tufted  
Type of surface: cut pile - multicoloured plain  
100% PA6  
Type of backing: textile backing - man-made fibres

### Harmful substances

The bans on use and thresholds, if applicable, in particular for SVHCs, carriers, azo dyes, allergenic and carcinogenic dyes, heavy metals chlorophenols (e.g. PCP), biocidal substances, phthalates and other softeners, halogenised flame retardants and  $Sb_2O_3$  as well as inorganic fibres specified in the GUT criteria have been met.

### Formaldehyde

The ban on the use of adjuvants containing or splitting off formaldehyde have been met.  
The formaldehyde emissions are  $< 10 \mu\text{g}/\text{m}^3$ .

### VOC emissions

Threshold in $\mu\text{g}/\text{m}^3$	3 days	28 days
TVOC ( $C_6-C_{16}$ ):	250	100
VOC without NIK:	100	50
SVOC ( $C_{16}-C_{23}$ ):	30	30
R-value:	1,0	1
HCHO:	10	4
carcinogenics:	not detectable	
benzene:	not detectable	

The limit values for VOC emissions indicated alongside, determined in accordance with the test chamber process (ISO 16000-6 or EN 10580), have been met. The test was made 3 days, or, where required, 28 days after placement into the chamber.

The evaluation of the emissions and the calculation of the R value were based on the then current LCI list of the AgBB.

### Odour

The product has passed the odour test with at least the grade 3.  
A slight odour of low intensity is permissible in new merchandise.

### Shares of recycled materials

The requirements regarding the content of contaminants and the emission behaviour apply unrestrictedly also to products whose manufacture included the use of recycled materials. The use of recycled raw materials (e.g. pile fibres) must be indicated when the manufacturer registers the article.

For a complete list of all limit values and test criteria see

[www.gut-ev.de](http://www.gut-ev.de)

Aachen, 18.02.2019



This certificate was issued electronically and requires no further signature

Gemeinschaft umweltfreundlicher Teppichboden e.V.,  
D-52068 Aachen, Schönebergstrasse 2

# PRODIS

THE COMPREHENSIVE  
EUROPEAN PRODUCT  
INFORMATION SYSTEM FOR  
TEXTILE FLOORCOVERINGS

# GUT Product Test Criteria and limit values

The GUT Signet can be granted only to members of Gemeinschaft umweltfreundlicher Teppichboden e.V.

(Only manufacturers of textile floorcoverings can become members)



The use of the substances listed below is either forbidden or GUT has specified limit values for the substances that must not be exceeded.

## ORGANIC CARRIERS (DYEING ACCELERANTS)

GUT test procedure No. 1

There is a ban on the use of the carriers listed.

Di-, tri-, tetra-, penta- and hexachlorobenzenes; di-, tri-, tetra- and pentachlorotoluenes

## AZODYES

GUT test procedure No. 2

There is a ban on the use of dyes and pigments which, under reductive conditions, release carcinogenic amines.

4-aminodiphenyl, benzidine, 4-chloro-o-toluidine, 2-naphthylamine, o-amino-azotoluene, 2-amino-4-nitrotoluene, p-chloroaniline, 2,4-diaminoanisole, 4,4'-diaminodiphenylmethane, 3,3'-dichlorobenzidine, 3,3'-dimethoxybenzidine, 3,3'-dimethylbenzidine, 3,3'-dimethyl-4,4'-diaminodiphenylmethane, p-cresidine, 4,4'-methylene-bis-(2-chloroaniline), 4,4'-oxydianiline, 4,4'-thiodianiline, o-toluidine, 2,4-diaminotoluene, 2,4,5-trimethylaniline, o-anisidine, p-amino-azobenzene\*, 2,4-xylidine, 2,6-xylidine, 6-amino-2-ethoxynaphthalene\*\*, 4-amino-3-fluorophenol\*\*  
(\*not identifiable, \*\*special procedure required)

## DISPERSE DYES

GUT test procedure No. 3

There is a ban on the use of the dyes listed, which are classified as "allergising".

C.I. Disperse Blue 1, -3, -7, -26, -35, -102, -106 and -124, C.I. Disperse Orange 1, -3, -37/76, C.I. Disperse Red 1, -11 and -17, C.I. Disperse Yellow 1, -3, -9, -39 and -49

## CARCINOGENIC DYES

GUT test procedure No. 4

There is a ban on the use of the dyes listed, which are classified as "carcinogenic".

C.I. Acid Red 26, C.I. Basic Red 9, C.I. Direct Red 28, C.I. Direct Blue 6, C.I. Disperse Blue 1, C.I. Disperse Yellow 3, C.I. Direct Black 38

## HEAVY METALS

GUT test procedure No. 5

Dyes and pigments containing the listed heavy metals as ingredients of the dyeing component must not be used to dye the pile material. The limit value for the total heavy metal content of a fitted carpet is 100 mg/kg.

Pb (lead), Cd (cadmium), Hg (mercury), Cr (chromium total) or Cr(VI)

## FLAME RETARDANTS

GUT test procedure No. 6

There is a ban on the use of the halogenous and phosphorous flame retardants listed.

PBB, TRIS, TEPA, SCCPs, PeBDE (pentabromodiphenylether)

## ACTIVE BIOCIDAL SUBSTANCES

### GUT test procedure No. 7

For the biocides listed that may be contained as active substances in respective formulations there is either a ban on their use or a limit value was specified for the respective active substance or group of active substances.

- 1) There is a ban on the use of products containing **TBT**.
- 2) The limit value for the **chlorophenols**, pentachlorophenol and tetrachlorophenol (PCP and TeCP), is 0.1 mg/kg.
- 3) For **orthophenylphenol** (OPP), there is a limit value of 1 mg/kg.
- 4) For the **chlororganic pesticides** listed, there is a limit value of 0.04 mg/kg for each individual substance and of 1 mg/kg for the sum of all components, respectively.  
o,p' and p,p' -DDE, -DDD and -DDT,  $\alpha$ ,  $\beta$ ,  $\delta$ ,  $\epsilon$ -hexachlorocyclohexane, aldrine, dieldrine, endrine, heptachlor, heptachloroepoxide, hexachlorobenzene, lindane, methoxychlor, mirex, toxaphene, \* $\alpha$ - and  $\beta$ -endosulphane
- 5) For the **phosphororganic pesticides** listed, there is a limit value of 0.04 mg/kg for each individual substance and of 1 mg/kg for the sum of all components, respectively.  
Diazinon, dichlorofenthion, dichlorophos\*\*, malathion\*\*, parathion-ethyl, parathion-methyl\*, trifluralin (\*special procedures required, \*\*other identification limits).
- 6) For the **herbicides**, 2,4,5-T and 2,4-D, there is a limit value of 0.04 mg/kg for each individual substance and of 1 mg/kg for the sum of all components, respectively.
- 7) Except for permethrine, there is a ban on the use of all **pyrethroids** for the protection of wool against moths and beetles.
- 8) As moth- and beetle-proofing agent for the sole finishing of woollen fitted carpets, **permethrine** may be used up to a maximum limit of 210 mg/kg. Application must be conducted in compliance with a prescribed procedure.

## EMISSIONS FROM TEXTILE FLOORCOVERINGS

### GUT test procedure No. 8

Volatile organic components from textile floorcoverings are determined in compliance with the test-chamber process. The following limit values are specified for the components listed.

TVOC	300 $\mu\text{g}/\text{m}^3$	Test chamber method (EN 13419; 1+2; ISO 16000). The test is performed 72h after $t = 0$ . For calculation and evaluation of the R-value, the actual LCI-Value List as published by AgBB* is used.
VOC without LCI	100 $\mu\text{g}/\text{m}^3$	
R-Value	$\leq 1$	
SVOC (C <sub>16</sub> to C <sub>22</sub> )	30 $\mu\text{g}/\text{m}^3$	
Carcinogenic Substances (EU-list Class 1 a. 2)	n.n.	

\* Ausschuss zur gesundheitlichen Bewertung von Baumaterialien

## ODOUR

### GUT test procedure No. 9

The material tested should only have the low-intensity odour typical of a new product.

The test mark following appraisal by a team of 7 persons must be a value  $< 4$ .

## REQUIREMENTS ON LATICES

### GUT test procedure No. 10

The latices used for coating must meet the following requirements on the residual monomer content.

For the individual substances styrene and 4-PCH, the limit value is 200 mg/kg of latex, and for ethylbenzene and 4-VCH, the limit value for each is 50 mg/kg of latex.

The limit value of the sum for all 4 components is 400 mg/kg of latex.

For the manufacture of foam coatings, there is a ban on the use of the vulcanisation accelerator Zn-diethyldithiocarbamate (ZDEC).



# DECLARATION OF PERFORMANCE

DOP: 1011#IE0ACV

1. Unique identification code of the product-type:

1011#IE0ACV

2. Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):

E-FORCE AB - Textile floor covering - pile carpet acc. EN 1307:2014

3. Intended use or uses of the construction product, in accordance with the applicable harmonised technical specification, as foreseen by the manufacturer:

For use as floor covering in buildings (see EN 14041) according to the manufacturer's specifications.

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5):

Balta Industries NV/Division ITC - Kanegemstraat 15 - B - 8700 Tielt



5. Where applicable, name and contact address of the authorised representative whose mandate covers the tasks specified in Article 12(2):

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6. System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V:

System 3

7. In case of the declaration of performance concerning a construction product covered by a harmonised standard: Name of the notified test laboratory, that has issued the certificate of conformity of the factory production control, inspection reports and calculation reports (if relevant).

CRET; Centre de recherches et d'etudes techniques du tapis Rue du vert bois, Zone industrielle, P.O. Box 30 F - 59531 Neuville-en-Ferrain Cedex

Notified Body





2013/084

certificate of constancy of performance

8. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:

not applicable

9. Declared performance

Essential characteristics	Performance	Harmonised technical specification
Reaction to fire		EN 14041:2008-05
Content of Pentachlorophenol		EN 14041:2008-05
Formaldehyd Emissions		EN 14041:2008-05
Slip resistance		EN 14041:2008-05
Electrical behavior (dissipative)	NPD	EN 14041:2008-05
Electrical behavior (conductive)	NPD	EN 14041:2008-05
Electrical behavior (antistatic)	NPD	EN 14041:2008-05
Thermal conductivity [W/mK]	NPD	EN 14041:2008-05
Water-tightness	NPD	EN 14041:2008-05

10. The performance of the product identified above is in conformity with the set of declared performance/s.


This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer Signed for and on behalf of the manufacturer by:

Luc Nelis, Production Manager

(name and function)

18.02.2019, Tielt

(place and date of issue)

  
(signature)



REACTION TO FIRE CLASSIFICATION REPORT  
N° 2013/084-1

(English report of classification report RC 2013/084)

According to EN 13501-1 (2007) + A1 (2013)

Notification by the French Government to the European Commission  
under n° NB 2401  
Regulation (UE) n° 305/2011

Sponsor : BALTA INDUSTRIES N.V / DIVISION I.T.C  
Kanegemstraat 15  
B 8700 TIELT  
BELGIUM

Product name : Products group Tufted carpet 100 % polyamide

Description : Textile floor coverings (EN 1307 family)  
(see detailed description in paragraph 2)

Date of issue : 27/05/2019 (Updated)

*The indicated classification does not prejudice the conformity of marketed materials with the samples submitted to the tests and under no circumstances, this document should not be considered as type approval or certification of the product in the sense of the L 115-27 article of the consumption's code of the law dated June 3<sup>rd</sup> 1994.*

*The reproduction of this classification report is only authorised in its integral form.  
It comprises 5 pages*

**1. Introduction**

This classification report defines the classification assigned to the above-mentioned product (s) in accordance with the procedures given in the NF EN 13501-1 standard: September 2007 & A1 (2013).

**2. Details of classified product****2.1. Product standard**

NF EN 14041 (2005):“ Resilient, textile and laminate floor coverings - Essential characteristics”.

**2.2. Product description**

Tufted pile carpet 100% polyamide on woven polypropylene backing (EN 1307 family).

Tested loose laid over a fibre-cement board classified A1<sub>f1</sub> or A2<sub>f1</sub> with a density (1800 ± 200) kg/m<sup>3</sup> and thickness (8 ± 2) mm.

Use surface: 100 % polyamide.

Nominal mass per unit area : 1350 to 2620 g/m<sup>2</sup>

Nominal effective pile thickness : 2,1 to 10,3 mm

**3. Test reports and tests results in support of this classification****3.1. Tests reports**

Name of laboratory	Name of sponsor	Test report N°	Test method
C.R.E.T.	BALTA INDUSTRIES N.V / DIVISION I.T.C Kanegemstraat 15 B 8700 TIELT BELGIUM	RL 2017/114 + classification report 2017/032-1 (21/02/2017)	EN ISO 9239-1

Name of laboratory	Name of sponsor	Test report N°	Test method
C.R.E.T.	BALTA INDUSTRIES N.V / DIVISION I.T.C Kanegemstraat 15 B 8700 TIELT BELGIUM	RL 2013/392 + classification report 2013/076-1 (28/11/2013)	EN ISO 9239-1

Name of laboratory	Name of sponsor	Test report N°	Test method
C.R.E.T.	BALTA INDUSTRIES N.V / DIVISION I.T.C Kanegemstraat 15 B 8700 TIELT BELGIUM	RL 2018/673 + classification report 2018/162-2 (19/09/2018)	EN ISO 9239-1



3.2. Tests results

Classes of reaction to fire for textile floor coverings, classified without further testing.

Test method	The floorings « <b>TRIANON AB / TN + dessin AB</b> » - « <b>MASTER AB - MAESTRO AB</b> » - « <b>E-TOUCH AB</b> » meet the requirements of table 2 of the standard EN 14041 and are classified without further testing (CWFT)
EN ISO 11925-2	<b>Classification E<sub>fl</sub></b>

Test method	Product	Number of tests	Parameters	Results
				Continuous parameters : mean value
EN ISO 9239-1	TRIANON AB / TN + dessin AB (classification report CRET 2017/032-1)	3	Critical heat flux (kW/m <sup>2</sup> )	≥ 4,5
			Smoke (% X min)	≤ 750

Test method	Product	Number of tests	Parameters	Results
				Continuous parameters : mean value
EN ISO 9239-1	MASTER AB – MAESTRO AB (classification report CRET 2012/076-1)	3	Critical heat flux (kW/m <sup>2</sup> )	≥ 4,5
			Smoke (% X min)	≤ 750

Test method	Product	Number of tests	Parameters	Results
				Continuous parameters : mean value
EN ISO 9239-1	E-TOUCH AB (Classification report CRET 2018/162-2)	3	Critical heat flux (kW/m <sup>2</sup> )	≥ 8,0
			Smoke (% X min)	≤ 750

4. Classification and field of application4.1. Reference of classification

This classification has been carried out in accordance with EN 13501-1 :2007 & A1 (2013).

4.2. Classification

Fire behaviour		Smoke production
C <sub>fl</sub>	-	s1

**Classification : C<sub>fl</sub> – s1**

#### 4.3. Field of application

This classification is valid for the following end use applications :

Loose laid over fibre-cement A2<sub>f</sub> or A1<sub>f</sub> class with a density  $\geq 1350 \text{ kg/m}^3$ .

This classification is valid for the following product parameters :

- A nominal mass per unit area of: 1350 to 2620 g/m<sup>2</sup>
- A nominal effective pile thickness of : 2,1 to 10,3 mm

The classification of the product family is valid for the following trademarks :

**AKROPOLIS AB**  
**AKTUA AB**  
**AKZENTO AB**  
**AMADEO AB**  
**ARISTOCRAT AB**  
**ART DECO AB**  
**ARTE AB / AT + dessin AB**  
**ARTO AB**  
**ARUNDEL AB / AD + dessin AB**  
**BAROQUE AB**  
**BELGRAVIA AB**  
**BELLEVUE AB**  
**BELVEDERE AB**  
**BIRKDALE AB**  
**BRIDGEFORD AB**  
**CAVALLI AB**  
**CHABLIS AB**  
**CHAMBORD AB**  
**CHIC AB**  
**COLUMN AB**  
**CONSUL AB / CS + dessin AB**  
**CORONET AB**  
**CRYSTAL PALACE AB**  
**E-FORCE AB**  
**E-GRID AB**  
**E-MAJOR AB**  
**E-ROCK AB**  
**E-TOUCH AB**  
**FEMI AB**  
**FLOXIMO AB**  
**FORTISSIMO AB**  
**GALLERIA AB**  
**GRANATA AB**  
**HERCULES AB**  
**HERITAGE NEW AB**  
**KREA AB**  
**MAESTRO AB**  
**MARQUIS AB / MQ + dessin AB**  
**MASTER AB**  
**MONOGRAM AB / MG + dessin AB**  
**PAGEANT AB**  
**PALACE NEW AB**



**PODIUM AB**  
**PROGRESSA AB / PG + dessin AB**  
**PROJECTA AB / PJ + dessin AB**  
**PROMENADE AB / PM + dessin AB**  
**PROMINENT AB**  
**PROSPECTA (NEW) AB / PP (NEW) + dessin AB**  
**PROVIDER AB / PV + dessin AB**  
**RICHELIEU AB**  
**RIVELLO AB / RV + dessin AB (= LOVE VINTAGE COLLECTION)**  
**ROCCA AB**  
**ROCKET AB**  
**SHERINGTON AB**  
**SIRIO AB**  
**SPIRIT AB**  
**SPLENDID AB**  
**SPONTINI AB**  
**TOSCANA AB**  
**TREVISO AB**  
**TRIANON AB / TN + dessin AB**  
**VIENNA AB**

## **5. Limitations**

This classification document does not represent type approval or certification of the product.

“The classification assigned to the product in this report is appropriate to a declaration of conformity by the manufacturer within the context of system 3 attestation of conformity and CE marking under the Construction Products Directive.

The manufacturer has made a declaration, which is held on file. This confirms that the products design requires no specific processes, procedures or stages (no addition of flame-retardants, limitation of organic content, or addition of fillers) that are aimed at enhancing the fire performance in order to obtain the classification achieved. As a consequence the manufacturer has concluded that system 3 attestation is appropriate.

The test laboratory has, therefore, played no part in sampling the product for the test, although it holds appropriate references, supplied by the manufacturer, to provide for traceability of the samples tested.”

For the SARL C.R.E.T.  
The Technical Director  
Marc WELCOMME



*End of the classification report*

# TFI Report 490064-01

## Sound Absorption Impact Sound Insulation

**Customer** Balta Industries N.V.  
Wakkensteenweg 2  
8710 Sint Baafs-Vijve  
BELGIUM

**Product** textile floor covering  
E-FORCE AB

This report includes 2 pages and 2 annex(es)

### Responsible at TFI

-Senior Engineer-  
Dr.-Ing. Heike Kempf  
Tel: +49 241 9679 171  
[h.kempf@tfi-aachen.de](mailto:h.kempf@tfi-aachen.de)

**Aachen, 11.02.2019**

Dr.-Ing. Bayram Aslan



The present document is provided with an advanced electronic signature

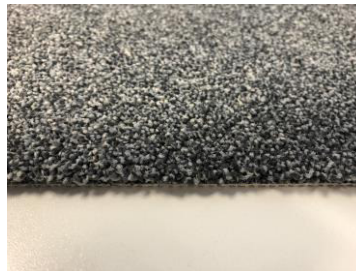
This report only applies to the tested samples and has been established to the best of our knowledge. Only the entire report shall be reproduced. Under no circumstances, extracts shall be used. Furthermore, we apply the "General Terms and Conditions for the Execution of Contracts" of the TFI Aachen GmbH, also with regard to the order execution.

## 1 Transaction

Test order	sound absorption according to EN ISO 354 impact sound insulation according to EN ISO 10140
Order date	10.01.2019
Your reference	SAVA 18/12
Sampling performed by	Customer
Product designation	E-FORCE AB
TFI sample number	19-01-0080

## 2 Product Specification

Type of manufacture	tufted
Type of surface	cut pile
Backing	finish
Pattern	tonal effect without pattern
Colour	dark grey, grey, light grey
View	



Thickness [mm]	9,0*
Area density [g/m <sup>2</sup> ]	2200*
Type of delivery	broadloom
	*customer information

## 3 Results

Sound absorption	$\alpha_w = 0,20$ (H)
Impact sound insulation	$\Delta L_w = 28$ dB

## 4 Annexes

Sound absorption	SA 490064-01 <sup>a</sup>
Impact sound insulation	TS 490064-01 <sup>a</sup>

The annexes marked <sup>a</sup> are based on tests accredited in accordance with EN ISO/IEC 17025.

# Annex SA - Sound Absorption Coefficient

## 1 Transaction

Product designation	E-FORCE AB
TFI sample number	19-01-0080
Testing period	05.02.2019

## 2 Test Method / Requirements

EN ISO 354:2003	Measurement of sound absorption in a reverberation room
EN ISO 11654:1997	Sound absorbers for use in buildings – Rating of sound absorption
Deviation from the standard	None

## 3 Remarks

- Type A, the test object is attached directly to a room surface or applied to it

## 4 Measuring Operation

Test noise:	broadband pink noise
Receive filter:	third octave band filter
Measurement:	2 loudspeaker positions 6 microphone positions

## 5 Laboratories

Test rooms:	laboratory of the TFI Aachen GmbH, Hauptstr. 133, 52477 Alsdorf, Germany
Test method:	reverberation room method
Volume:	211 m <sup>3</sup>
Total surface:	213 m <sup>2</sup>
Floor plan:	trapezoidal
Reflectors:	6 aluminium plates 1.0 m x 2.0 m 7 plywood boards 1.5 m x 1.3 m 1 aluminium plate 1.8 m x 0.9 m

## 6 Measuring Devices

Real time analyser:	Norsonic Nor140, SN: 1406926
Microphone:	Norsonic Type 1209/21134
Loudspeaker:	2 dodecahedrons

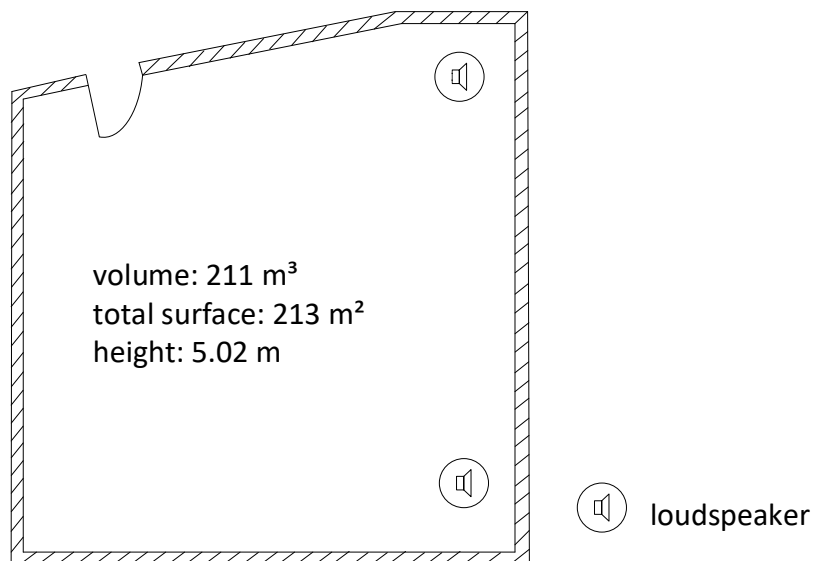
## 7 Evaluation

The decay curves are determined using the interrupted noise method. Several decay curves measured at one microphone and/or loudspeaker position are averaged in order to reach a sufficient reproducibility. The reverberation time of the room is expressed by the arithmetic mean derived from the total number of all reverberation time measurements in each frequency band.

The equivalent sound absorption area of the test specimen  $A_T$  is calculated as the difference between the equivalent sound absorption area of the reverberation room with test specimen  $A_2$  and the equivalent sound absorption area of the empty reverberation room  $A_1$  without test specimen.

The equivalent sound absorption coefficient  $\alpha_s$  describes the ratio of the equivalent sound absorption area  $A_T$  of a test specimen divided by the area of the test specimen.

The evaluated sound absorption coefficient  $\alpha_w$  is a single-number frequency-independent value which equals the value of the reference curve at 500 Hz after shifting it.



*Drawing reverberation room*

Measurement of sound absorption coefficient in a reverberation room

Annex SA – Sound absorption

TFI sample no.: 19-01-0080

Testing period: 05.02.2019

Construction: -  
(from top to bottom)

Product name: E-FORCE AB

Reverberation room / without

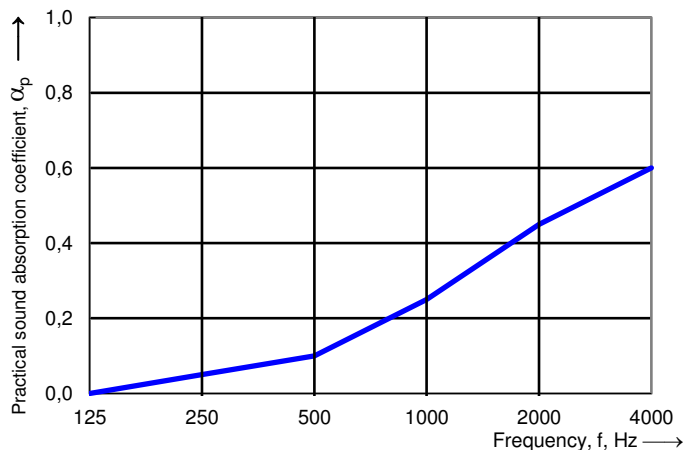
Relative humidity: 43,8 %  
Temperature: 17,1 °C  
Barometric pressure: 100,8 kPa

Reverberation room / with sample

Relative humidity: 43,8 %  
Temperature: 17,1 °C  
Barometric pressure: 100,8 kPa

Surface area: 12,05 m<sup>2</sup>  
Room volume: 211,0 m<sup>3</sup>  
Total room area St: 213 m<sup>2</sup>

Frequency f [Hz]	$\alpha_p$ Oktave
100 125 160	0,00
200 250 315	0,05
400 500 630	0,10
800 1000 1250	0,25
1600 2000 2500	0,45
3150 4000 5000	0,60



Weighted sound absorption coefficient according to ISO 11654

$$\alpha_w = 0,20 \text{ (H)}$$



# Sound absorption according ISO 354

SA 490064-01

Measurement of sound absorption coefficient in a reverberation room

Annex SA – Sound absorption

Page 2 of 2

Weighted sound absorption coefficient according to ISO 11654

$$\alpha_w = 0,20 \text{ (H)}$$

Surface area: 12,05 m<sup>2</sup>  
Room volume: 211,0 m<sup>3</sup>  
Total room area St: 213,0 m<sup>2</sup>

Frequency [Hz]	$\alpha_p$	$\alpha_s$	A [m <sup>2</sup> ]	T1 [s]	T2 [s]
50		-0,02	-0,3	6,27	6,61
63	0,00	0,00	0,0	6,86	6,84
80		0,01	0,1	10,31	10,08
100		0,01	0,1	12,01	11,55
125	0,00	0,03	0,4	6,53	6,08
160		0,02	0,2	5,97	5,76
200		-0,02	-0,3	6,32	6,67
250	0,05	0,08	1,0	6,88	5,76
315		0,06	0,7	5,93	5,27
400		0,07	0,8	5,77	5,08
500	0,10	0,10	1,2	6,06	4,99
630		0,13	1,5	6,02	4,76
800		0,17	2,0	5,93	4,40
1000	0,25	0,24	2,9	5,44	3,73
1250		0,30	3,6	5,44	3,45
1600		0,41	4,9	5,13	2,96
2000	0,45	0,46	5,6	4,61	2,63
2500		0,52	6,2	3,89	2,28
3150		0,49	5,9	3,18	2,06
4000	0,60	0,60	7,3	2,48	1,62
5000		0,65	7,9	1,85	1,30

Reverberation room / without sample:

Relative humidity: 43,8 %  
Temperature: 17,1 °C  
Barometric pressure: 100,8 kPa

Reverberation room / with sample:

Relative humidity: 43,8 %  
Temperature: 17,1 °C  
Barometric pressure: 100,8 kPa

TFI sample number:

19-01-0080





# Annex TS - Impact Sound Insulation

## 1 Transaction

Product designation	E-FORCE AB
TFI sample number	19-01-0080
Testing period	31.01.2019

## 2 Test Method / Requirements

EN ISO 10140-1:2014	Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for certain products
EN ISO 10140-2:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation
EN ISO 10140-3:2015	Acoustics - Laboratory measurement of sound insulation of building elements - Part 3: Measurement of impact sound reduction
EN ISO 10140-4:2010	Acoustics - Laboratory measurement of sound insulation of building elements - Part 4: Measurement procedures and requirements
EN ISO 10140-5:2014	Acoustics - Laboratory measurement of sound insulation of building elements - Part 5: Requirements for test facilities and equipment
EN ISO 717-1:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation
EN ISO 717-2:2013	Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound reduction
EN ISO 12999-1: 2014	Acoustics - Determination and application of measurement uncertainties in building acoustics - Part 1: Sound insulation

## 3 Remarks

None

## 4 Measuring Operation

Measurement of the impact sound pressure level:	Using 4 fixed microphone positions, with 1 tapping machine position for each microphone position (The single results of the one-third-octave-bands were averaged on an energy basis)
Test surface:	~ 1,5 m <sup>2</sup>
Category:	I
Connection with the floor:	loose laid

Damage to the sample: None  
 Corrections: background noise corrections and airborne sound corrections

## 5 Laboratories

Test rooms: Laboratories of the TFI Aachen GmbH, Hauptstrasse133, 52477 Alsdorf, Germany  
 Sending room (1.04):  $V = 52.1 \text{ m}^3$  (with diffusers)  
 Receiving room (0.01):  $4.05 \text{ m} \times 3.95 \text{ m} \times 3.33 \text{ m} + 2.00 \text{ m} \times 0.98 \text{ m} \times 0.18 \text{ m}$ ;  $V = 53.6 \text{ m}^3$  (cuboid room, with diffusers)  
 Reference floor:  $4.27 \text{ m} \times 4.46 \text{ m}$ ;  $S = 19.04 \text{ m}^2$   
 14 cm concrete slab floor with an area-related mass of  $m' \sim 322 \text{ kg/m}^2$   
 Flanking walls: Lime sand brick walls with light wall facings (facing shell  $d = 12 \text{ cm}$ )  
 with an average area-related mass of  $m' \sim 330 \text{ kg/m}^2$

## 6 Measuring Devices

Real time analyser: Norsonic Nor140, SN: 1406927  
 Norsonic Nor140, SN: 1406926  
 Microphone: Norsonic Type 1209/21135  
 Norsonic Type 1209/21134  
 Tapping machine: NORSONIC, Type 211, SN: 502  
 (standard tapping machine with 3 feet and 5 hammers according to ISO 10140)

## 7 Evaluation

The impact sound pressure level generated by the standard tapping machine is measured in the receiving room under a bare heavy floor with and without a floor covering. The impact sound reduction is determined on the basis of the measured values as follows:

$$\Delta L = L_{n,0} - L_n \text{ (dB)}$$

$L_{n,0}$  Impact sound pressure level without a floor covering (dB)

$L_n$  Impact sound pressure level with a floor covering (dB)

For the evaluation of the weighted reduction in impact sound pressure level  $\Delta L_w$ , the relevant reference curve is shifted in increments of 1 dB towards the measured curve until the sum of unfavourable deviations is as large as possible, but not more than 32 dB.

The linear impact sound level  $\Delta L_{lin}$  is determined according to the following equation:

$$\Delta L_{lin} = L_{n,r,0,w} + C_{l,r,0} - (L_{n,r,w} + C_{l,r}) = \Delta L_w + C_{l,\Delta}$$

$L_{n,r,w}$	is the calculated weighted normalized impact sound pressure level of the reference floor with the floor covering under test
$L_{n,r,0,w}$	78 dB, calculated from $L_{n,r,0}$ according to Section 4.3.1 of DIN EN ISO 717-2: 2013
$C_{l,r}$	Spectrum adaptation term for the reference floor with the floor covering to be tested
$C_{l,r,0}$	-11 dB, spectrum adaptation term for the reference floor with $L_{n,r,0}$ determined according to Annex A, Section A.2.1 of DIN EN ISO 717-2:2013

## 8 Note

The results are based on measurements performed under laboratory conditions with artificial excitation (standard procedure). The test results are applicable in due consideration of the national provisions and the local circumstances and/or constructions.

# Impact sound insulation according ISO 10140-1

TS 490064-01

Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight reference floor

Annex TS – Impact sound insulation

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TFI sample number: 19-01-0080 Testing period: 31.01.2019

Product name: E-FORCE AB

Installed by: TFI Aachen GmbH

Construction:  
(from top to bottom)

Receiving room:

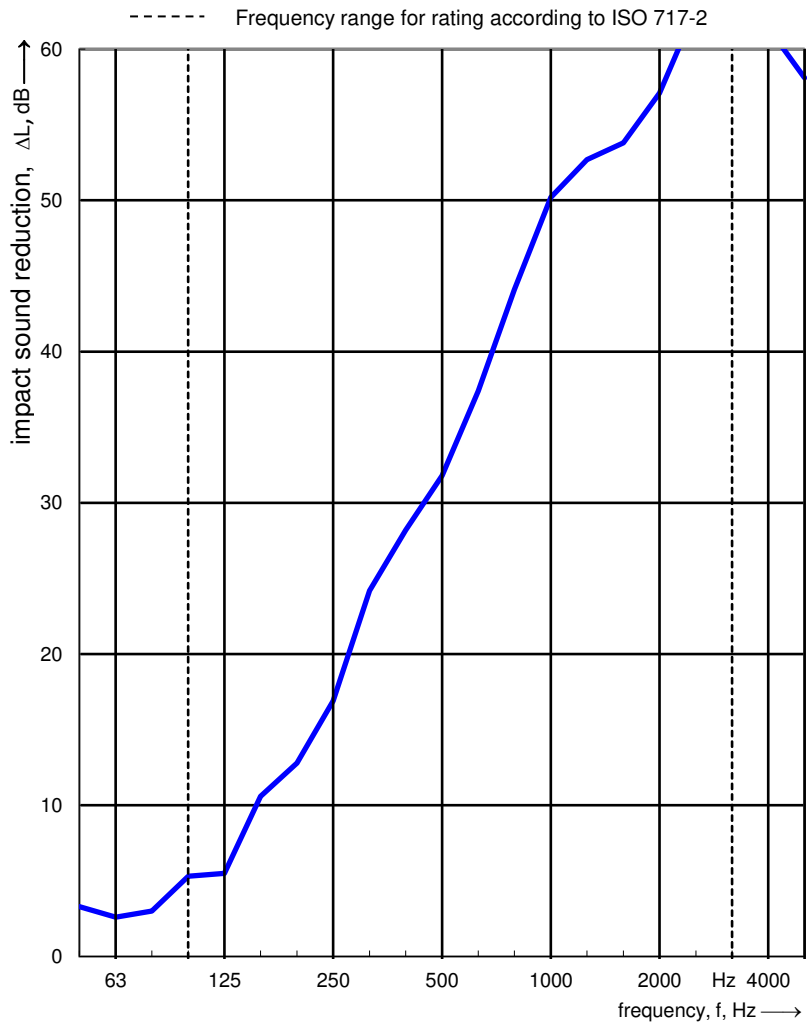
Volume: 53,6 m<sup>3</sup>  
Air temperature: 20,7 °C  
Relative air humidity: 60,7 %  
Static pressure: 97,8 kPa

Source room:

Volume: 52,1 m<sup>3</sup>  
Air temperature: 20,0 °C  
Relative air humidity: 36,8 %  
Type of reference floor: Heavyweight

Frequency f [Hz]	L <sub>n,0</sub> 1/3 oct. [dB]	ΔL 1/3 oct. [dB]
50	62,7	3,3
63	61,8	2,6
80	59,4	3,0
100	59,5	5,3
125	64,3	5,5
160	61,7	10,6
200	64,3	12,8
250	66,0	16,9
315	63,4	24,2
400	63,7	28,2
500	64,5	31,8
630	64,5	37,4
800	64,9	44,1
1000	67,1	50,2
1250	67,4	52,7
1600	67,7	53,8
2000	67,6	57,1
2500	67,0	62,7 <sup>1</sup>
3150	67,6	62,3 <sup>1</sup>
4000	66,1	61,4 <sup>1</sup>
5000	62,3	58,1 <sup>1</sup>

<sup>1</sup> too high



Evaluation according to ISO 717-2

ΔL<sub>w</sub> = 28 dB

C<sub>l,Δ</sub> = -12 dB

C<sub>l,r</sub> = 1 dB

The results are based on measurements, which were performed under laboratory conditions with artificial excitation (standard procedure).



Laboratory measurements of the reduction of transmitted impact noise by floor coverings on a heavyweight reference floor

Annex TS – Impact sound insulation

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Evaluation according to ISO 717-2

$$\Delta L_w = 28 \text{ dB}$$

$$C_{l,\Delta} = -12 \text{ dB}$$

$$C_{l,r} = 1 \text{ dB}$$

The results are based on measurements, which were performed under laboratory conditions with artificial excitation (standard procedure).

Weighted normalized impact sound pressure level  $L_{n,0,w} = 74 \text{ dB}$ Weighted normalized impact sound pressure level  $L_{n,w} = 45 \text{ dB}$ Weighted normalized impact sound pressure level  $L_{n,r,w} = 50 \text{ dB}$ 

Frequency [Hz]	$\Delta L$ [dB]	$L_{n,0}$ [dB]	$L_n$ [dB]	$L_{n,r}$ [dB]
50	3,3	62,7	59,4	
63	2,6	61,8	59,2	
80	3,0	59,4	56,4	
100	5,3	59,5	54,2	61,7
125	5,5	64,3	58,8	62,0
160	10,6	61,7	51,1	57,4
200	12,8	64,3	51,5	55,7
250	16,9	66,0	49,1	52,1
315	24,2	63,4	39,2	45,3
400	28,2	63,7	35,5	41,8
500	31,8	64,5	32,7	38,7
630	37,4	64,5	27,1	33,6
800	44,1	64,9	20,8	27,4
1000	50,2	67,1	16,9	21,8
1250	52,7	67,4	14,7	19,3
1600	53,8	67,7	13,9	18,2
2000	57,1	67,6	10,5	14,9
2500	62,7	67,0	4,3	9,3
3150	62,3	67,6	5,3	9,7
4000	61,4	66,1	4,7	
5000	58,1	62,3	4,2	

Receiving room:

Volumen: 53,6 m<sup>3</sup>

Air temperature: 20,7 °C

Relative air humidity: 60,70 %

Static pressure: 97,8 kPa

Source room:

Volumen: 52,1 m<sup>3</sup>

Air temperature: 20,0 °C

Relative air humidity: 36,8 %

Type of reference floor: Heavyweight

