



Test report: Bending strength NaturinForm Popular Massive®

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Date: May 26, 2026



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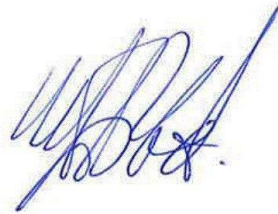
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Project number: 25.0522

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1 Assignment

On April 9, 2026 NaturinForm commissioned SHR to perform several bending tests on Popular Massive® decking boards. According to the principal, the Popular Massive® is produced using an extrusion method and is made with wood fibres and plastics. The material used for Popular Massive® is based on plastics and fibres released at the production of adhesive labels, this extruded part has no cavities. The boards will be used on balconies, placed on supports with a maximum spacing between the support points of 400 mm.

2 Execution of the test

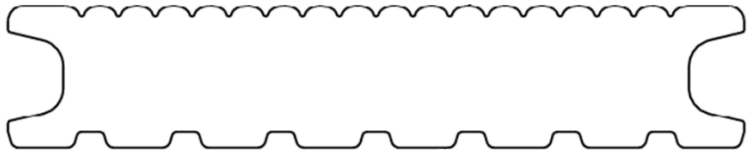
2.1 Identification and description of the samples

For the test, the samples mentioned in table 1, were delivered at SHR on February 24, 2026. The production and selection of the test pieces is carried out by the principal. Cross sections of the samples are given in table 2.

Table 1. Delivered samples.

Amount	Code	Description
10	25.0522-AM 1 to 10	four-point-bending test (L=400 mm) according to EN 408, single profile (b=140 mm), Popular Massive®
10	25.0522-BM 1 to 10	bending test (L=400 mm) with concentrated load (0.1 x 0.1 m), at midspan on a single profile (b=140 mm). Popular Massive®

Table 2. Cross section sample.

Popular Massive®	
Breite: 138,6 mm Dicke: 25,5 mm	

2.2 Method

The samples have been tested in a four-point bending configuration according to the principles of EN 408 and using a three-point bending test according to the principles of EN 310. The centre-to-centre distance of the supports is set on 400 mm. The samples have been loaded until failure at a rate of 300 ± 120 seconds per test. The two different loading conditions are given in figure 1 and 2.

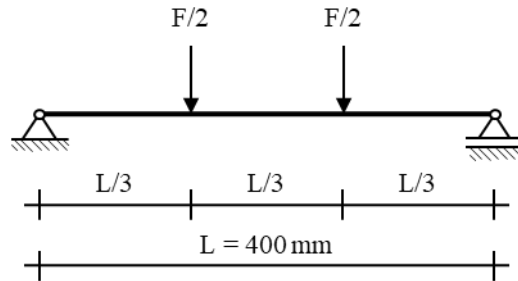
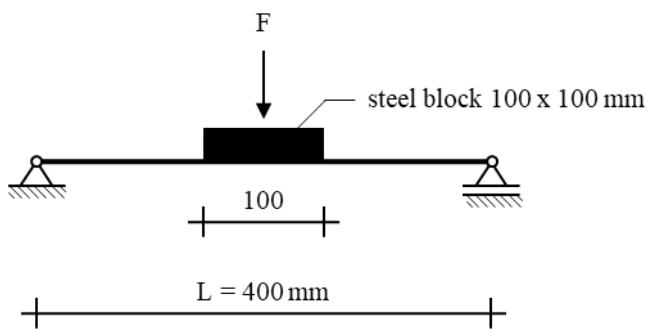


Figure 1. Four-point-bending tests according to the principles of EN 408 (AM).

The four-point-bending test is added to determine the strength of the boards. This property is used to check the uniformly distributed load.



Serie BM:
- load on a single profile

Figure 2. Bending strength with a concentrated load (BM).

The concentrated load is based on loads given in the Dutch National Annex of Eurocode 1, see Appendix 1.

Characteristic values

The characteristic values (5-percentile values) have been determined in accordance with EN 1990:

$$X_k = m_x - k_n \cdot s_x$$

Where:

X_k - characteristic value of stochastic variable m

m_x - sample mean value of n test values: $m_x = \frac{1}{n} \sum_{i=1}^n m_i$

k_n - factor used to calculate characteristic properties, see table 3

s_x - standard deviation:

$$s_x = \sqrt{\frac{\sum (x_i - m_x)^2}{n - 1}}$$

n - number of test values

Table 3. Values of k_n for the 5% characteristic value.

n	3	4	5	6	8	10	15	20	25	30	40	∞
k_n	3.37	2.63	2.33	2.18	2.00	1.92	1.85	1.76	1.75	1.73	1.72	1.64

See also annex D (normative) of EN 1990+A1+A1/C2:2011

Design value

The design value is determined according to EN 1995-1-1:

$$F_d = \frac{F_k}{\gamma_m} \cdot k_{\text{mod}}$$

Where:

- F_d - design value of a property
- F_k - characteristic value of a property
- k_{mod} - modification factor (depends on climate class, load duration and material)
- γ_m - partial factor for material properties

2.3 Apparatus

Universal test machine Testometric CT 150 kN (calibrated)

SHR/581

Digital caliper Mitutoyo (calibrated)

SHR/434

2.4 Period of the test

The tests were executed on March 26 and March 30, 2026.

3 Results of the test

3.1 Execution of the laboratory test



Picture during testing of 25.0522-AM



Picture during testing of 25.0522-BM

3.2 Test results

The individual test results are given in Appendix 3 for series AM and in Appendix 4 for series BM.

The results have been checked in accordance with the floor loads given in the Dutch National Annex of the Eurocode. An overview is given in table 4.

Table 4. Overview results.

Profile	Load	Safety class	Result
Popular Massive®	uniformly distributed load ($q_k = 2.5 \text{ kN/m}^2$)	CC1 (dwellings)	passed
Popular Massive®	uniformly distributed load ($q_k = 2.5 \text{ kN/m}^2$)	CC2 (offices)	passed
Popular Massive® single profile	concentrated load on $0.5 \times 0.5 \text{ m}$ ($F_k = 3.0 \text{ kN}$)	CC1 (dwellings)	passed
Popular Massive® single profile	concentrated load on $0.1 \times 0.1 \text{ m}$ ($F_k = 3.0 \text{ kN}$)	CC2 (offices)	passed

The measurement uncertainty of the test results is available on request. Decision rule: When assessing the results, the measurement uncertainty was not taken into account.

4 Discussion

The loading conditions for deckings depends on the situation: balconies at dwellings or balconies at offices. In the first case the concentrated load is distributed over an area of $0.5 \times 0.5 \text{ m}$. In the last case the concentrated load is distributed over an area of $0.1 \times 0.1 \text{ m}$. A summary of the part of the Dutch National Annex is given in Appendix 1 concerning the loading conditions (in Dutch). An overview is given in table 5.

Table 5. Loading conditions on balconies.

	Uniformly distributed load q_k [kN/m ²]	Concentrated load F_k [kN]	Surface of the concentrated load [m x m]
Balconies at dwellings (non-common use)	2.5	3.0	$0.5 \times 0.5 \text{ m}$
Balconies at offices	2.5	3.0	$0.1 \times 0.1 \text{ m}$

5 Conclusion

Commissioned by NaturinForm the Popular Massive® decking is tested to be used in balconies. The application area of the boards depend on the loading conditions: offices or dwellings.

An overview of the test results is given in table 4 in section 3.2.

Literature

EN 408:2010+A1:2012 Timber structures - Structural timber and glued laminated timber - Determination of some physical and mechanical properties.

NEN-EN 1990:2002+A1+A1/C2:2011 Eurocode: Basis of structural design.

NEN-EN 1990:2002+A1+A1/C2:2011/NB:2019 National Annex to NEN-EN 1990+A1+A1/C2: Eurocode: Basis of structural design.

NEN-EN 1991-1-1:2002+C1+C11:2019 Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings.

NEN-EN 1991-1-1+C1+C11/NA:2019 National Annex to Eurocode 1: Actions on structures - Part 1-1: General actions - Densities, self-weight, imposed loads for buildings.

NEN-EN 1995-1-1:2005+C1:2006+A1/A2:2014 Design of timber structures – Part 1-1: General – Common rules and rules for buildings.

NEN-EN 1995-1-1:2005+C1+A1/NB:2013 National Annex to NEN-EN 1995-1-1+C1+A1 Eurocode 5: Design of timber structures - Part 1-1: General - Common rules and rules for buildings (includes NEN-EN 1995-1-1+C1+A1/C1:2012).

Appendix 1 Floor load according to Dutch National Annex of Eurocode 1

Summary

	Uniformly distributed load q_k [kN/m ²]	Concentrated load F_k [kN]	Surface of the concentrated load [m x m]
Balconies at dwellings (non-common use)	2.5	3.0	0.5 x 0.5 m
Balconies at offices	2.5	3.0	0.1 x 0.1 m

Tabel NB.1 - 6.2 — Gebruiksbelastingen op vloeren, balkons, trappen en bordessen van gebouwen

Klasse van belast oppervlak	q_k kN/m ²	Q_k^b kN
Klasse A (wonen en huishoudelijk gebruik)		
A-gemeenschappelijke vloeren, trappen en balkons	3,0	3
A-niet-gemeenschappelijke vloeren	1,75	3 ^c
A-niet-gemeenschappelijke trappen	2,0	3 ^c
A-niet-gemeenschappelijke balkons	2,5	3 ^c
Klasse B (kantoorruimten)		
B-kantoorruimten	2,5	3
B-omsloten afzonderlijke verkeersruimte	3	3

Klasse van belast oppervlak	q_k kN/m ²	Q_k^b kN
Klasse C (bijeenkomstruimten)		
C-omsloten afzonderlijke verkeersruimte, niet horend bij C5	5	3
C1-tafels	4,0 ^a	3
C2-vaste zitplaatsen	4,0 ^{a c}	7 ^a
C3-zonder obstakels voor rondlopende mensen	5,0	7
C4-fysieke activiteiten	5,0	7
C5-grote mensenmassa's	5,0 ^d	7
Klasse D (winkelruimten)		
D-omsloten verkeersruimten	4,0	7
D1-kleinhandel	4,0	7
D2-warenhuizen	4,0	7
^a Voor ruimten met uitsluitend een onderwijsfunctie waar les wordt gegeven, volstaat een vloerbelasting q_k van 2,5 kN/m ² en Q_k van 3 kN. ^b Tenzij anders vermeld, zijn de afmetingen van de puntlast gelijk aan 0,1 m × 0,1 m. ^c Afmetingen puntlast gelijk aan 0,5 m × 0,5 m. ^d Bij tribunes moet bovendien rekening zijn gehouden met een gelijkmatig verdeelde opwaartse gebruiksbelasting gelijk aan 50 % van de neerwaarts gerichte gebruiksbelasting. Deze belasting brengt het dynamisch effect in rekening dat kan optreden als gevolg van de bewegende massa van mensen (opspringen). De neerwaartse en opwaartse gebruiksbelastingen moeten afzonderlijk als extreme veranderlijke belasting worden beschouwd. Tevens moet bij de neerwaartse gebruiksbelasting op tribunes gelijktijdig rekening zijn gehouden met een veranderlijke gelijkmatig verdeelde horizontale belasting die kan optreden als gevolg van de bewegende mensenmassa. Deze horizontale belasting bedraagt 10 % van de verticale belasting en moet wat betreft de richting zijn beschouwd als een vrije belasting. Door het in rekening brengen van de opwaartse en gelijkmatige verdeelde horizontale belasting als statische belasting wordt voorkomen dat voor tribunes dynamische berekeningen moeten worden gemaakt om het effect van een bewegende mensenmassa te bepalen op de sterkte van de tribune.		

Appendix 2 Product info NaturinForm Popular Massive®

Popular massive

Popular massive has been creating a relaxed leisure atmosphere on numerous terraces and balconies for many years. In 2017, as a specialist in wood composite materials made in Germany, we received the general building inspectorate approval (no. Z-10.9-484) for this. The German Institute for Building Technology in Berlin (DIBt) is thus granting approval for the first time for patio decking made of a wood composite material without it being related to a surface laid in combination. This means that the decking can be laid as a load-bearing floor outdoors – even in public buildings – without the need for additional measures for fall-through protection are required.

Note: Laying must be done according to the approval regulations!

NaturinForm products have a natural look due to their high wood content of 70 %. They are easy to maintain, splinter-free, weather-resistant and durable. Our material is produced in Germany and is recyclable multiple times.

Format



W: ca. 139 mm
H: ca. 26 mm

Category

monochrome massive deck,
can be laid on both sides

Surface

finely striated, brushed
or widely striated, brushed

Standard lengths

ca. 4 m / ca. 5 m / ca. 6 m

Special lengths

ca. 2 – 13 m at extra charge,
delivery time on request

Weight

ca. 3.60 kg / m

Loadability

ca. 800 kg / dm²

Country of manufacture

Germany



Care and cleaning

Our products are particularly easy to care for and weatherproof. Compared to conventional timber profiles, they do not need to be oiled or painted and still do not splinter or crack. Cleaning is very easy with water or, in the case of heavy dirt, with our biodegradable special cleaner.

Laying instruction

For 1 m² Popular massive you require ca. 7 decks à 1 m, depending on local conditions ca. 2.5 – 3 m base profile and ca. 16 stainless steel brackets with screws. More details in our laying instructions.

Sustainable material

Our wood composite material consists 70 % domestic wood and 30 % pure polymer (PE) with food approval. In production, we use residual fibres from the wood industry and use them to manufacture innovative, durable and recyclable quality products for outdoor use.

Environmentally friendly colours

Colours are achieved with mineral based pigments. These produce an even and durable, as well as natural colour image and are neither harmful to health nor to the environment.

Certificates

Our products are subject to constant quality controls and stress tests.

100% PEFC-certified
PEFC/04-31-2196

Safety of Toys
corresponds to EN 71-3:2019

Durability
Class 1, resistency inspection
against wood-destroying fungi

Evaluation fire behaviour
Class E, very comparable to wood

Evaluation non-slippery
R13, finely striated
R13, widely striated

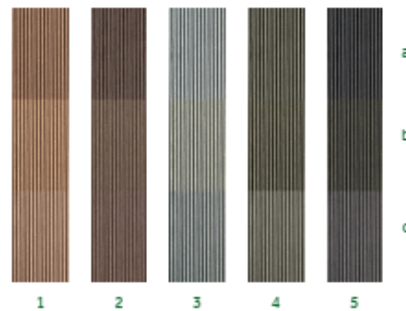
Product features

Standard colours

- 1 Brown
- 2 Black brown
- 3 Grey
- 4 Stone grey
- 5 Anthracite

Maturation process

- a Freshly produced
- b After a few days
- c Fully weathered



Due to the high wood content, a natural optical maturation occurs. The surface of the freshly produced product (a) loses the initial gloss and the yellowish shade of the wooden fibres will recede after being exposed to weather effects. The desired natural matt colour tone emerges. (c)

Special colours	from 50 m², minimum purchase 10 pcs./single length You can find more details at: www.naturinform.com	
Straightness deviation	± 1.00 mm / m horizontal ± 1.00 mm / m vertical	EN 15534-1
Arch	± 1.50 mm / total width	EN 15534-1
Density	1.30 g / cm³	ISO 1183
Bending resistance	≤ 0.30 mm with span 400 mm	DIN E 310
Breaking resistance	≥ 14000 N with span 400 mm	DIN E 310
Moisture resistance (boil test)	≤ 0.40 % length variation ≤ 0.60 % width variation ≤ 3.50 % thickness variation ≤ 4.50 g weight variation	EN 15534-1 EN 15534-4
Water retention after storage in water for 28 days	≤ 0.35 % length variation ≤ 0.60 % width variation ≤ 3.00 % thickness variation ≤ 4.50 % weight variation	EN 15534-1 EN 15534-4
Thermic expansion coefficient	–	ISO 11359-2 / DIN 53752
Ignition temperature	420 °C	DIN 51795

Appendix 3 Individual test results: uniformly distributed load

Series:	AM		
Description:	four-point-bending test EN 408		
span	400	mm	
width	140	mm	
profile	NaturinForm Popular Massive®		
Date tests:	26 March 2026		
Test nr.	F_{max} [N]	F_{max} [kN]	M_{max} [kNm]
1	12 585	12.58	0.839
2	12 385	12.38	0.826
3	12 279	12.28	0.819
4	12 505	12.50	0.834
5	12 112	12.11	0.807
6	12 490	12.49	0.833
7	12 350	12.35	0.823
8	12 317	12.32	0.821
9	12 439	12.44	0.829
10	12 179	12.18	0.812
Min		12.11	0.81
Mean		12.36	0.82
Max		12.58	0.84
St.Dev		0.15	0.01
VC (%)		1.20	1.20
Characteristic values according to NEN-EN 1990 annex D			
n			10
k_n			1.92
M_{Rk}	[kNm]		0.81
Design value according to NEN-EN 1995-1-1			
γ_m			1.30
k_{mod}	(SC:3, medium-term)		0.65
M_{Rd}	[kNm]		0.40



Check: uniformly distributed load		dwelling
q_k	kN/m^2	2.50
q_k	kN/m^1	0.35
γ_q	CC1	1.35
q_d	kN/m^1	0.47
M_{Ed}	[kNm]	0.01

UC	0.02	$\leq$	1.00	OK
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Check: uniformly distributed load		offices
q_k	kN/m^2	2.50
q_k	kN/m^1	0.35
γ_q	CC2	1.50
q_d	kN/m^1	0.53
M_{Ed}	[kNm]	0.01

UC	0.03	$\leq$	1.00	OK
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Appendix 4 Individual test results: Concentrated load: on a single profile

Series:	BM		
Description:	concentrated load: 0.1 x 0.1 m		
span	400	mm	
width	140	mm	
profile	NaturinForm Popular Massive®		
number	single		
Date tests:	30 March 2026		
Test nr.	F _{max} [N]	F _{max} [kN]	Time [s]
1	11 018	11.02	252
2	10 520	10.52	241
3	11 052	11.05	265
4	10 888	10.89	238
5	11 071	11.07	247
6	10 763	10.76	238
7	10 939	10.94	243
8	10 906	10.91	249
9	11 060	11.06	242
10	10 916	10.92	246
Min		10.52	
Mean		10.91	
Max		11.07	
St.Dev		0.17	
VC (%)		1.54	
Characteristic values according to NEN-EN 1990 annex D			
n		10	
k _n		1.92	
F _{Rk}	[kN]	10.59	
Design value according to NEN-EN 1995-1-1			
Y _m		1.30	
k _{mod}	(SC:3, medium-term)	0.65	
F _{Rd}	[kN]	5.29	



Check: concentrated load on 0.1 x 0.1 m		offices
F_k	kN	3.00
γ_q	CC2	1.50
F_{Ed}	[kN]	4.50

UC	0.85	$\leq$	1.00	OK
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Check: concentrated load on 0.5 x 0.5 m		dwellings
F_k	kN	3.0
q_k	kN/m ²	12.0
q_k	kN/m ¹	1.7
γ_q	CC1	1.35
q_d	kN/m ¹	2.27
M_{Ed}	[kNm]	0.05
M_{Rd}	[kNm]	0.40

UC	0.11	$\leq$	1.00	OK
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