

Leaf

311(313) 439	beech, oak	Seat:	Veneer or upholstery	Leg connections:
Meets level:	× I. EN	× II. EN	✓ I. BIFMA	✓ II. BIFMA
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Approved on:	5.4.2022			

TON products are tested thoroughly throughout the entire manufacturing process to ensure compliance with international standards for quality, safety and durability. The tests are performed in TON's internal testing laboratory, where pre-determined load levels are applied repeatedly to individual chair components.

✓ fulfils the norm
 × does not fulfil the norm
 - not applicable



Test no.	Standard	Test type	Load level		EN		BIFMA		Description	Diagram
			I.	II.	I.	II.	I.	II.		
1.	EN 1728, 6.4	seat static load and backrest static load test	A – seat load: 1,600 N B – backrest load: 560 N 10 cycles	A – seat load: 2,000 N B – backrest load: 700 N 10 cycles	✓	✓	–	–	A set amount of static load is applied to the seat and the backrest.	
2.	EN 1728, 6.5	seat front edge static load test	A – load: 1,300 N 10 cycles	A – load: 1,600 N 10 cycles	✓	✓	–	–	Static load is applied in an alternating fashion on two points on the front edge of the seat, as close to the side edges as possible.	
3.	EN 1728, 6.6	vertical load on backrest test	A – seat load: 1,300 N B – backrest load: 600 N 10 cycles	A – seat load: 1,800 N B – backrest load: 900 N 10 cycles	✓	✓	–	–	The back of the chair is tested by applying downward load to the top of the backrest, on the centre line of the back.	
4.	EN 1728, 6.8 BIFMA no. 18	footrest static load test	A – load: 1,300 N 10 cycles	A – load: 1,600 N 10 cycles	✓	✓	✓	✓	The test simulates static pressure applied to the footrest when used as support for rising from the chair.	
5.	EN 1728, 6.10 BIFMA no. 13	armrest sideways static load test	A – load: 400 N 10 cycles	A – load: 900 N 10 cycles	–	–	–	–	The test simulates outward pressure applied to the armrests simultaneously.	
6.	EN 1728, 6.11 BIFMA no. 12	armrest downwards static load test	A – load: 750 N 5 cycles	A – load: 900 N 5 cycles	–	–	–	–	Static downward load is applied to the front edge of the armrests. The test simulates pressure applied when the armrests are used as supports for rising from the chair.	
7.	EN 1728, 6.15	leg forward static load test	A – seat load: 1,000 N B – load: 500 N 10 cycles	A – seat load: 1,800 N B – load: 620 N 10 cycles	✓	✓	–	–	Static load is applied in a forward direction to the centre of the rear of the seat. Front legs must be secured to prevent movement.	
8.	EN 1728, 6.16	leg sideways static load test	A – seat load: 1,000 N B – load: 400 N 10 cycles	A – seat load: 1,800 N B – load: 760 N 10 cycles	✓	✓	–	–	Static load is applied centrally to one side of the seat from the direction of the opposite side. The front and rear legs on the opposite side must be secured to prevent movement.	
9.	EN 1728, 6.17 BIFMA no. 15	combined seat and backrest durability test	A – seat load: 1,000 N B – backrest load: 300 N 100,000 cycles	A – seat load: 1,000 N B – backrest load: 300 N 200,000 cycles	✓	✓	✓	✓	Static load is applied to the seat and the backrest simultaneously over a long period. The test simulates repetitive load during longterm use.	
10.	EN 1728, 6.18 BIFMA no. 10.4	seat front edge durability test	A – seat load: 800 N 50,000 cycles	A – seat load: 800 N 100,000 cycles	✓	✓	✓	✓	Static load is applied alternately to two points on the front edge of the seat, as near as possible to the side edges of the seat.	
11.	EN 1728, 6.20 BIFMA no. 20	armrest durability test	A – load: 400 N 30,000 cycles	A – load: 400 N 60,000 cycles	–	–	–	–	Static load is applied to both armrests simultaneously at an angle of 10°. The test assesses armrest durability during longterm use.	
12.	EN 1728, 6.21 BIFMA no. 19	footrest durability test	A – load: 1,000 N 50,000 cycles	A – load: 1,000 N 100,000 cycles	✓	✓	✓	✓	Static load is applied repeatedly to the footrest. The test assesses footrest durability during longterm use.	
13.	EN 1728, 6.25	backrest impact test with a 6.4 kg hammer	height of fall 210 mm at angle of 38° 10 cycles	height of fall 330 mm at angle of 48° 10 cycles	✓	✓	–	–	The test assesses durability of the chair when the backrest is hit from behind.	

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			I.	II.	I.	II.	I.	II.		
14.	EN 1728, 6.26	armrest impact test with a 6.4 kg hammer	height of fall 210 mm at angle of 38° 10 cycles	height of fall 330 mm at angle of 48° 10 cycles	-	-	-	-	The test assesses durability of the chair when the armrests are hit from the sides.	
15.	EN 1728, 6.28	fall test (number of cycles determined internally)	10 cycles	30 cycles	x	x	-	-	The chair is tipped backwards until it reaches a balance point, and then allowed to fall freely on its back. The same test is carried out from both sides.	
16.	BIFMA no. 6	backrest strength test - static	A - backrest load 667 N 10 cycles	A - backrest load 1,001 N 10 cycles	-	-	✓	✓	The test examines whether the chair can withstand pressure applied to the backrest by its user.	
17.	BIFMA no. 7	fall test - dynamic	test sack weighing 102 kg dropped from a height of 152 mm 1 cycle	test sack weighing 136 kg dropped from a height of 152 mm 1 cycle	-	-	✓	✓	The test examines whether the chair can withstand the impact of a load dropped on the centre of the seat.	
18.	BIFMA no. 10.3	seat durability test - cyclic		57 kg weight dropped on seat from a height of 36 mm 100,000 cycles	-	-	-	✓	The test assesses durability of the chair with repeated impact on the centre of the seat.	
19.	BIFMA no. 11	stability test - back		seat load 60 kg load exerted on top disc set by seat height 1 cycle	-	-	-	✓	Six discs are placed on the seat and a load equal to at least 90 N is applied horizontally against the top disc. Back legs must be secured to prevent movement. The chair must not topple.	
20.	BIFMA no. 11	stability test - front		vertical load 61 kg 1 cycle	-	-	-	✓	The test assesses stability of the chair. The chair must not topple as a result of the applied load.	
21.	BIFMA no. 17	static test of leg strength - front leg from the side	front leg load 334 N 10 cycles	front leg load 503 N 10 cycles	-	-	✓	✓	Static load is applied repeatedly to the front leg from the side. Chair secured to prevent movement.	
22.	BIFMA no. 17	static test of leg strength - front leg from the front	front leg load 334 N 10 cycles	front leg load 503 N 10 cycles	-	-	✓	✓	Static load is applied repeatedly to the front leg from the front. Back legs must be secured to prevent movement.	
23.	BIFMA no. 22	test of chair with a tray table - static with load		tray table load 68 kg 10 cycles	-	-	-	-	The test examines whether the chair and tray table can withstand pressure applied by a vertical load. Front legs must be secured to prevent movement.	
24.	BIFMA no. 23	test of chair with a tray table - cyclic with and without load		tray table load 25 kg 100,000 cycles	-	-	-	-	The test assesses durability of the tray table with repeated loading. Chair secured against movement.	
25.	BIFMA no. 24	structural durability test - cyclic		seat weight 109 kg in the middle load: 334 N 25,000 cycles	-	-	-	✓	The test examines whether the chair structure can withstand impacts and general wear and tear resulting from sideways forces.	
26.	TON internal test	free fall test to the floor		fall from a height of 100 mm on front and back leg 10 cycles			✓		The test assesses durability of the chair after falling on the front and back legs.	

Our products are exported to more than 60 countries, and that is why we regularly test not only according to European standards, but also according to the North American BIFMA standards.

EN 16139

This European standard outlines the requirements for safety, strength and durability for all types of non-residential furniture used by adults weighing up to 110 kg. Compliance with EN 16139 is tested through methods outlined in relevant parts of standard EN 1728.

ANSI/BIFMA X5.1

The Business and Institutional Furniture Manufacturers Association (BIFMA) is a US trade association that sets the standards for safety and durability of seating furniture in North America.

Testing methods

A sample of the seating furniture undergoes safety, strength and durability tests as detailed in these tables.

Level	Type of use	Extent of use
I.	general use	Places where seating furniture is usually intended for short-term use and where the load is light to heavy. Examples include: public buildings, cafes, restaurants, dining halls, banks and bars.
II.	extreme use	Places where seating furniture is sometimes or often subjected to extremely high loads, either due to specific type of use or incorrect use. Examples include: nightclubs, police stations, public transport hubs, changing rooms for athletes, prisons and army barracks.

We test TON products at both levels and always endeavour to reach level II - extreme use.