

***CENTAUR***  
***brings***  
***Boflex Sports Floors***  
***to***  
***America***

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## **THE PRODUCT IDEA**

Injuries caused by indoor activities have increased dramatically over the past few years. This is a natural result of increased indoor activity; but a major additional factor is that these activities are being performed on flooring that features poor shock absorption, inadequate resilience and excessive surface friction.

A number of athletic medical projects have revealed that surface-elastic parquet flooring induces a far smaller number of injuries than that of other floor types. International research has produced similar findings.

Boen has wide experience in the field of sports floor construction and has been responsible for more than 500,000 sm of sports flooring in Scandinavia; Norway in particular. There has been an obvious requirement for sports flooring that contributes to a considerable reduction in the number of ligament and strain injuries.

Boen's new sports floor naturally complies with the DIN 18032 which is internationally recognized as the leading standard for the performance criteria of sports floors. Moreover, the floor features the following practical advantages:

- The floor is equally suitable for the athletic activities of all age groups, whether they are recreational or professional.
- The construction withstands almost unlimited loading.
- The resilience is built-in during manufacture.
- Pre-finished. Requires lacquering only if track marking has been added.
- Very quick installation time.
- Exceptionally low overall floor height.

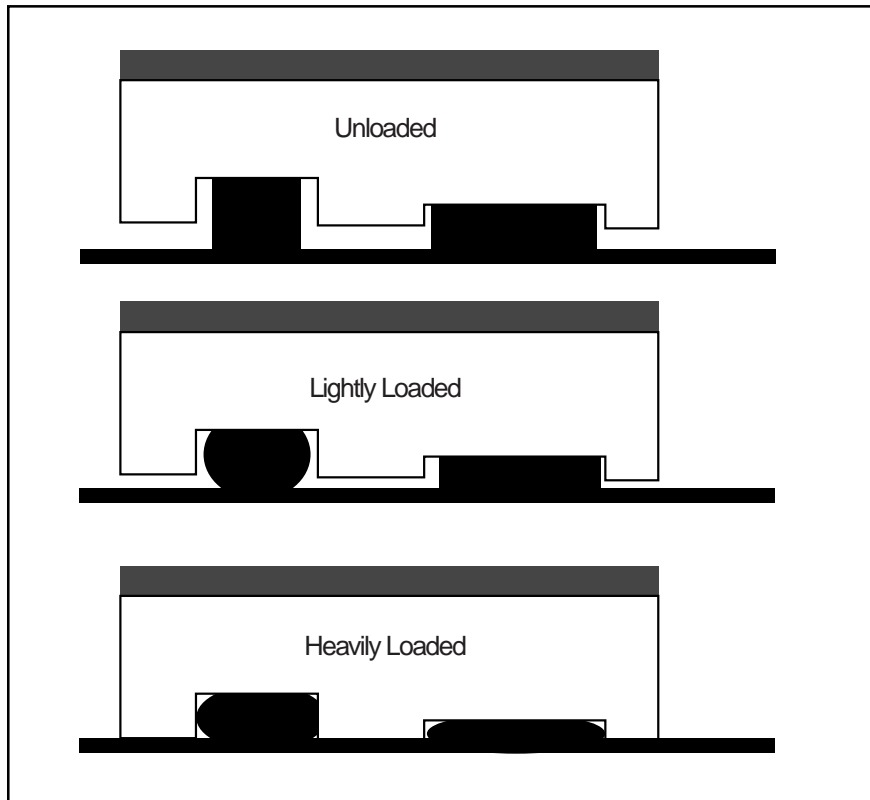
## **CONSTRUCTION/PATENT**

Boen's Sports Floor - Boflex P1 is a surface elastic sports floor; the elasticity being built into the parquet. The resilience and shock absorption qualities are provided by Evazote 50, a material developed specifically to withstand dynamic loads.

Evazote 50 (ethylene-vinyl-acetate) is a chemically cross-linked closed cell (diagonal layered) foam and has been manufactured without the use of any gases hazardous to the environment.

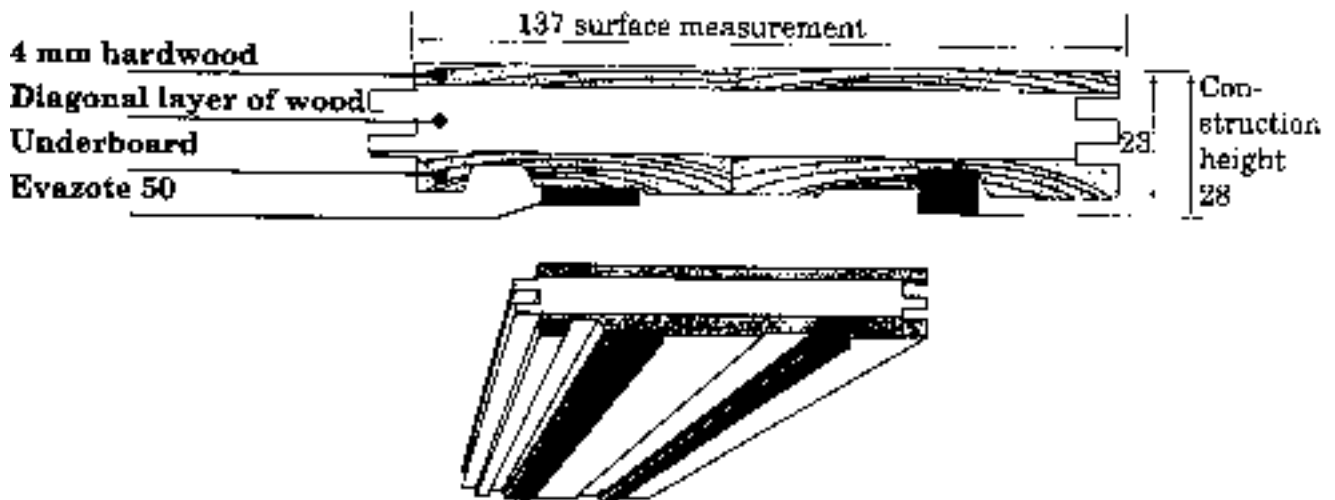
It is a precondition that the subfloor is flat and level to ensure even resilience across the floor surface. The floor is layed floating with double tongue and groove joints to ensure adequate lateral strength, as well as providing adequate lateral rigidity.

The elastic material will only be 10-30% compressed during normal athletic activities. Even extreme loading will not damage the resilient material as it is 50% inlaid to avoid total compression.



The floor is based on our 23mm longstrip parquet which features superior stability compared to solid strip flooring.

The overall finished floor height, including the resilient material, is 28mm. The exceptionally low floor height makes the sports floor well suited to refurbishments; installation may take place without implementing any major structural changes.



## WOOD TYPES

In principle we can deliver any species requested by our customers, but it should normally be one of the hardwood species from our standard range. Pine excluded, the following scale of hardness is indicative.

MEDIUM HARD ←————→ VERY HARD		
European Oak	Norwegian Oak	Maple*
Birch	Ash	Merbau
Beech	Angelique	Mutenye
Iroko		

\* Canadian Hard-Maple

Normally we stock Maple and Norwegian Oak.

## Laying

Boen Sports Flooring is dried to attain 7+/-1% relative humidity corresponding to that for furniture wood. This characteristic must be preserved during installation. All doors and windows must be installed and all work involving moisture must be completed well in advance of floor laying.

Buildings must be heated and aired regularly during a period of at least eight weeks prior to laying the parquet. The relative humidity in the building should be between 30% and 65% at 20 degrees centigrade. The ideal condition is approximately 40%-50% at 20 degrees centigrade.

## Subfloor Requirement

The subfloor must be stable, fully supporting and level, maximum permitted deviation is 2mm per 2 meter diameter. Specifications in the UK are according to Table 2 of British Standard (BS) 8203 (1987), stating that the maximum permitted deviation is +/- 3mm per 3 metre diameter.

If the subfloor does not comply with these requirements, improvements are required. The use of a self-leveling screed or equivalent will be adequate.

## Instructions for Installation in New Buildings

- Two layers of 0.2mm plastic membrane are laid on the subfloor before Boen Sports Flooring - Boflex P1 is installed.

- Relative humidity (RH) in the subfloor must be less than 90%. In concrete surfaces the humidity samples must be taken from a point 10cm below the surface. Specifications in the UK state that humidity in concrete / screed subfloors must be less than 75%. This criteria and the correct test method are laid down in BS 8032 (ID87) Appendix A: Dampness

## Testing

Practical experience has proved that a newly cast concrete floor ought to be dried artificially for a minimum of eight weeks prior to installing sports flooring.

## Instructions for Refurbishment Installations

Boen Sports Floor is laid directly onto existing surfaces. If the subfloor is concrete, an initial layer of 0,2mm plastic membrane must be laid as a moisture barrier. NB. Damp room installations in ground floor and basement installations may require additional moisture barriers. Contact Architect/Consultant.

## Distance to Walls/Columns

The expansion gap required between the wall and the floor is calculated as 1,5mm per metre width. Example: If the gymnasium is 24 metres wide an expansion gap of 18mm is required on either side of the floor.

## Cornices/Skirting

Skirting boards should be fastened only to the wall so as not to impede the movement of the floor.

## Adhesive

Our special adhesive is supplied with all deliveries and should always be applied during laying.

## Movements and Weights

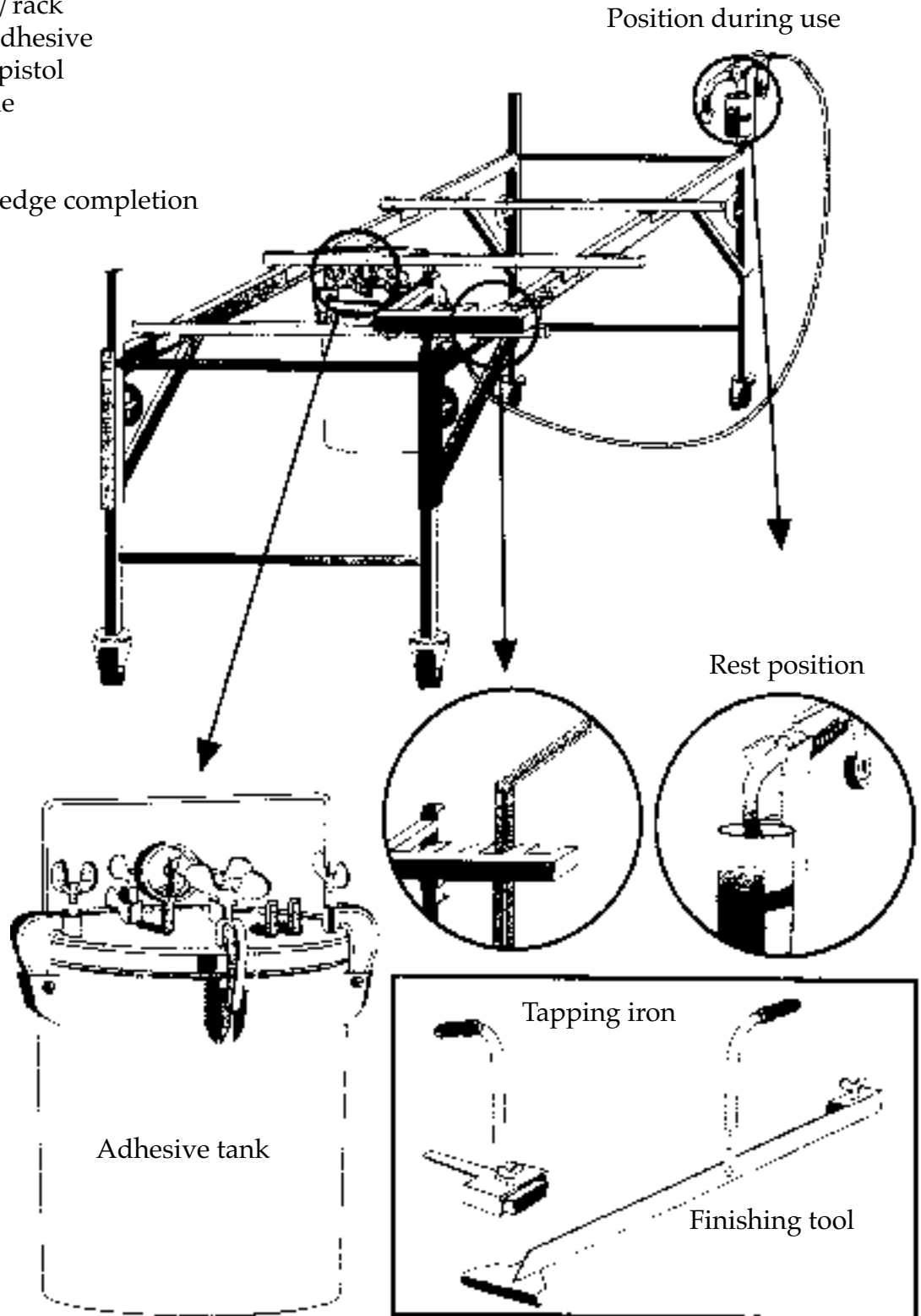
1 package (6 boards) = 1.81 m <sup>2</sup> weight 21 kg
1 pallet (49 packages) = 88.69 m <sup>2</sup> weight 1029 kg
Volume per pallet = ( 1.07 x 1.0 x 2.20)m = 2.354 m <sup>3</sup>

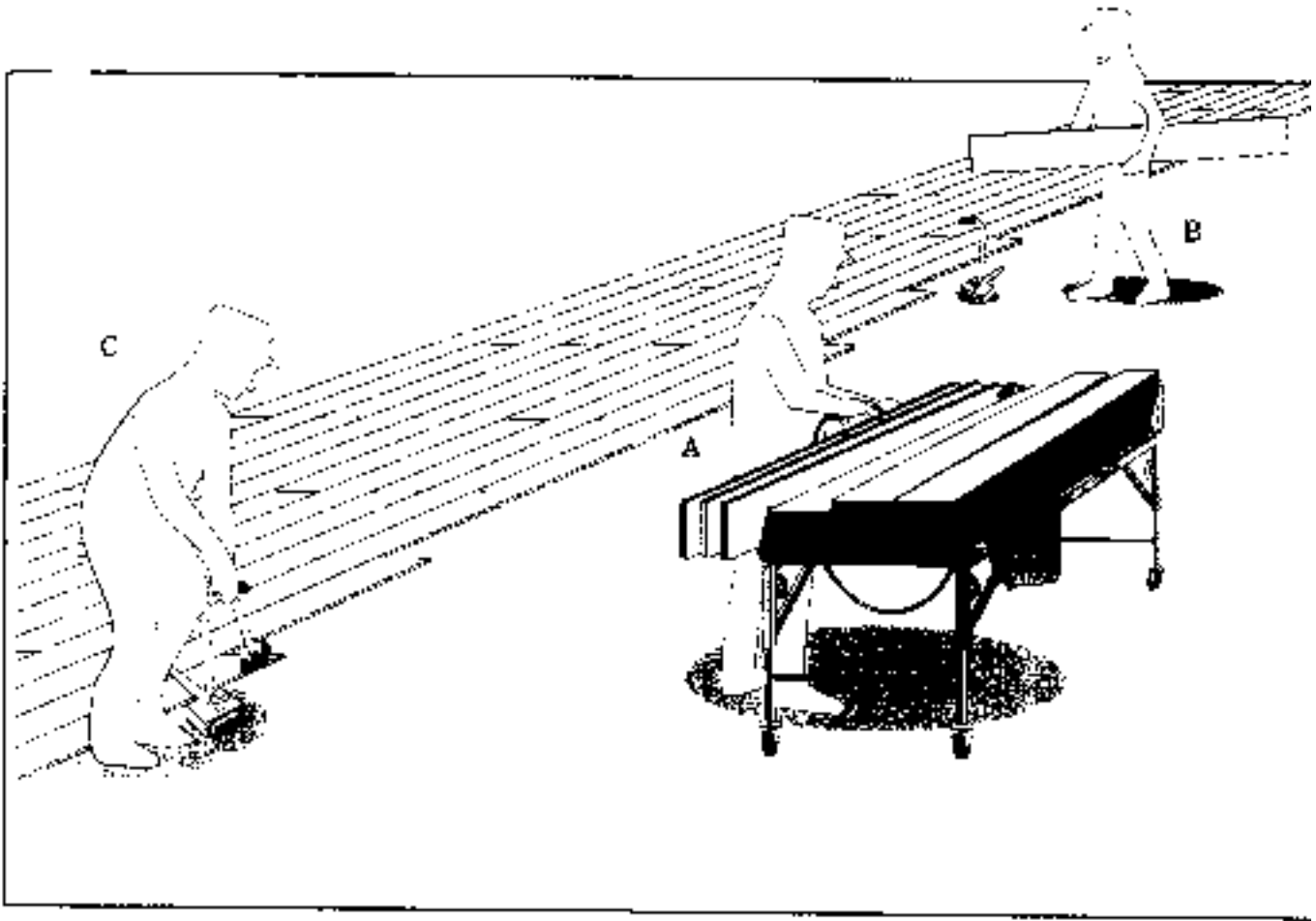
Packaging must not be opened until the laying is about to begin. Where full access into the building is possible the floor will be delivered packed on pallets.

# LAYING EQUIPMENT

Boen has developed special laying equipment ensuring proper adhesive application and effective laying:

- Collapsible trolley / rack
- Pressure tank for adhesive
- Hose w / adhesive pistol
- Mouthpiece / nozzle
- Compressor
- 2 tapping blocks
- Crow bar for end / edge completion





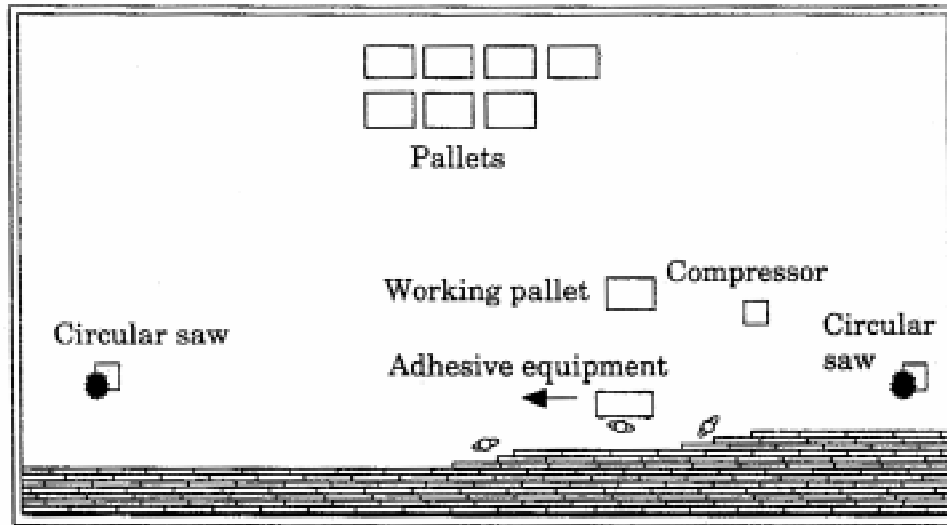
1. The laying trolley is loaded with 25-30 m<sup>2</sup> of parquet.
2. Begin the laying in the left hand corner.
3. Use a string for alignment.
4. Operation:
  - A. 1 person operates adhesive equipment and pushes the trolley as the laying proceeds.
  - B. 1 person lays 2-4 rows ahead of the trolley.
  - C. 1 person lays 2-4 rows behind the trolley.
5. The trolley is refilled on the way back.

## Smaller floors

When laying smaller floors it is most practical to use 1 or 2 people.

## Speed of laying

Experience has proved that a laying speed of approx. 6 m<sup>2</sup> per work hours for floors sized at 200-300 m<sup>2</sup> is average. For larger floors, the laying speed increases to approx. 10 m<sup>2</sup> per work hour.



General plan displaying laying in a gymnasium

## Gym Apparatus Fittings / Casings

Gym apparatus fittings are usually fastened into concrete but may also be attached with Araldite.

There shall be no connection between the sports floor and the apparatus fittings. The floor must be free to move. However, metal rings with removable caps may be recessed into the surface of the floor.

## Track Marking

After laying, the floor is immediately ready for track marking. Athletic associations in various countries have their own respective colors for individual sports.

## Surface Treatment

During the manufacturing process the floor is finished with five coats of W-cured lacquer which is highly resistant to wear.

Due to the following, however, it is recommended that an additional layer of lacquer is applied after installation:

- Protection of track marking
- Frequent cleaning

A number of athletic functional criteria have been issued for sports flooring. These criteria may vary from country to country but the German DIN standards are often applied as guidelines.

DIN approved floors must have been tested at the Otto Graf Institute in Germany or at the Norwegian Building Research Institute (NBI). Boen Sports Floor Boflex P1 is DIN approved.

	<b>DIN 18032 SECTION II</b>	<b>SPORTS FLOOR BOFLEX</b>	<b>ADDITIONAL INFORMATION</b>
<b>SHOCK ABSORPTION</b>	Minimum 53%	61%	Boflex features a shock absorption quality of 61%. This implies that when the floor is exposed to a given load 61% of the pressure is absorbed by the floor.
<b>DEFORMATION</b>	Minimum 2.3 mm	2.8 mm	A given test load is released from a given height. The floor deflects 2.8 mm. The result meets the DIN requirements by a wide margin.
<b>W 500 LOAD PROPOGATION</b>	Maximum 15%	14.2%*	If the deflection is calculated to be 100% at the load point itself = the deflection by only 14.2% @ 500 mm from the load point. This is well within the maximum permitted by the DIN standard.
<b>FRICTION</b>	.50—.70	0.59	The DIN requirement for friction coefficient ranges from 0.50-0.70. this is a compromise adjusted to several sports. NB. low friction coefficient = slippery floor. Boflex is well within the DIN standard.
<b>BALL BOUNCE</b>	Minimum 70%	94%	Ball bounce indicates how high the ball bounces after being dropped from a given height (concrete = 100%). Boflex provides 94% ball bounce; a very satisfactory result compared to the DIN requirment.
<b>ROLLING LOAD</b>	Minimum 1500 N	OK	The floor construction complies with the DIN requirement.

The Norwegian Building Research Institute has tested the floor in accordance with DIN 18032 Section 2. Boen Sports Floor Boflex P1 complies with all standard criteria.

Beyond the above athletic technical characteristics NBI has also tested the floor over time (simulated long term use of the floor).

The construction has been tested with 45,000 test loads without loss of its' elastic characteristics and the tongue / groove-connection in the floor has been stressed 100,000 times without damage.

NBI's findings are conclusive: **Boen Sports Floor Boflex P1 is well suited for sports flooring.**