seilspielgeräte manufaktur berlin

having fun for sure

smb-net fence SILENTIQ
German Technical Inspection Agency (TÜV) Noise emission measurement

The smb-net fence SILENTIQ sets itself apart from other soccer court fences with quality features listed below: first-class quality meets high-end acoustic insulation.

Design variety

Posts and ropes can individually be colored to fit into the environment and the surrounding playgrounds.

Low-wear product

The measuring was taken at a soccer facility that has already been in use for seven years.

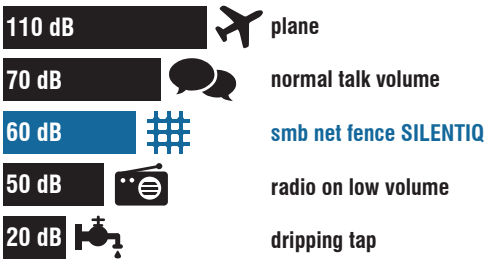
Accoustic insulation

Due to the flexible net structure the net fence SILENTIQ directly compensates punctual impacts – such as from footballs.
The smb-net fence does not only meet the permitted acoustic level in residential areas but even falls short of it.
The measuring corresponds to a football at a speed of 80 km/h.

First-class quality

8 mm 4-strand Hercules rope, connection using ROWOCON® bushings, rope connection elements with highly robust and esthetic smb-ellipse knots.

Acoustic intensity of various noises in comparison



The measuring was carried out by TÜV Nord based on the following standards:
DIN 45635
DIN EN ISO 3744

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22.01.2018

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Measuring report

Noise emission measurement at a ball catch netting fence for soccer courts from smb Seilspielgeräte Berlin GmbH in Hoppegarten

Client	smb Seilspielgeräte GmbH Berlin Technikerstr. 6-8 15366 Hoppegarten
Subject	Immission protection – Noise
Order Date	27.04.2017
No. of pages	13 pages, of which 4 pages Annex
Task	Determination of noise emissions

Signature for the content:

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Engineer

Gewerbelärm
Verkehrslärm
Fluglärm
Sportlärm
Freizeitlärm
Geräuschemissionen
Bau- und Raumakustik
Lärm am Arbeitsplatz
Erschütterungen
Olfaktometrie
Immissionsprognosen
Umweltverträglichkeit

Deutsche Akkreditierungsstelle D-PL-11074-01-00

Test laboaratory accredited by DAkkS to DIN EN ISO/IEC 17025.

The accreditation applies to the test procedure stated in the relevant certificate.

The laboratory is also a notified measuring body according to § 29b BImSchG.

Valid until: 24.06.2020

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1 Task

Noise nuisance is generally a result of traffic noise. But sports and leisure activities are in fact also major sources of noise. Discussions with people who are confronted with noise problems in public parks in the course of their work have revealed that – in addition to children's screaming and shrieking - the noise of balls striking the ground, clanging and rattling netting fences and ball scoring baskets are often a cause of complaint.

If a ball is shot against a ball catch netting fence, the impulse of the ball causes vibration within the complete fence. These vibrations quite often give rise to a clanging noise if they are transferred outwards to the posts and the area of fencing between them vibrates back and forth between its fixing points.

In order to reduce these vibrations at the fixing points, the company smb Seilspielgeräte GmbH markets and sells a special ball catch netting fence. In this system, instead of the rigid mesh netting that is frequently used, rope nets are attached to the fence poles by means of a patented screw connection. Based on the elastic qualities of the rope nets, this solution is intended to result in lower noise development within the entire ball catch fencing system.

The fixing method can be seen in **Photo 3** in the Annex.

In order to prevent complaints and conflicts related to noise, approving authorities ever more frequently require the use of low-noise materials and designs. Town planners and noise control assessors also state that that there is a need for information regarding low-noise materials and designs for ball catch fences.

The task of the present investigation is therefore to gather noise emission data regarding the ball catch fencing system of smb Seilspielgeräte GmbH. The characteristic noise data that are determined are also to serve as noise forecasts for planned sports and leisure facilities.

2 Basis of measurement

[01] DIN 45635, Part 1, Edition of April 1984
Measurement of noise emitted by machines; airborne noise emission; enveloping surface method; basic method, divided into 3 grades of accuracy

[02] DIN EN ISO 3744, Edition of February 2011
Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane

3 Fence system

The test rig to be investigated here consists of a ball catch fence system erected 7 years ago (in 2010), consisting of vertical posts (Ø 88,9 mm) and the attached rope nets. The size of the rope net panels is stated as 2.50 m x 4.00 m, and the size of the mesh within them is stated as 60 x 120 mm (see photos in the Annex). The vertical posts are normally anchored with plate and socket elements. The ends of the rope nets are set into ROWOCON® sleeves and screwed into the posts with Torx securing bolts (M10).

4 Measurement

4.1 Performance of measurements

Measuring period	12.05.2017, 10:30 to approx.12:00
Meteorology	Air temperature approx. 19°C, light wind (< 3 m/s)
Height of microphone/ Measuring points	approx. 1.8 m above ground, 1, 3 and 5 m from the point of impact
Measuring devices	Class 1 sound level meter Norsonic Type 140, Device No. 1403101/07, calibrated up to the end of 2018 Norsonic Type 140, Device No. 1403102/07, calibrated up to the end of 2019 Norsonic Type 140, Device No. 1404811, calibrated up to the end of 2018

Table 1: Measuring conditions

4.2 Measuring rig

In order to ensure even excitation of the rope netting and achieve reproducible results, a gallows-type structure based on the pendulum impact test described in DIN EN 12600 was erected next to the ball catch system to be investigated.

A tyre with a mass of 5.8 kg was hung on the gallows on a 3.4 m long rope; the air pressure in the tyre was 2.0 bar. The effective drop height of the tyre was selected as h ≈ 1.60 m, which corresponds to deflection of the “pendulum” of around 58°.

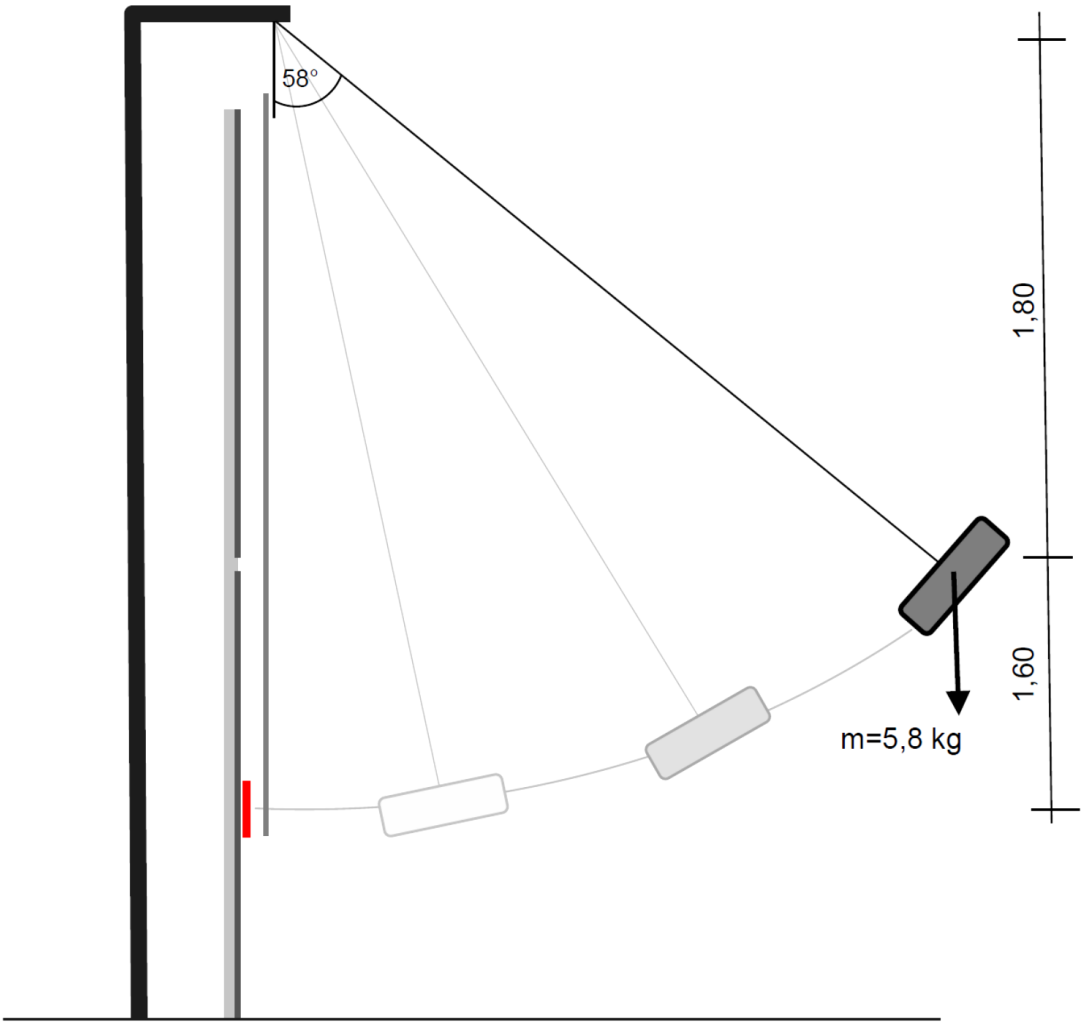

Figure 1: Sketch of basic principle (not to scale)

Using this data and taking the above deflection into consideration, the speed of the test body when striking the rope net (equilibrium position) can be calculated as approx. 20 km/h.

Converted to comparable energy released by a football with a mass of approx. 400 g, an impact at a speed of approx. 80 km/h would result[1].

4.3 Measurement results

The maximum sound levels at the measuring location shown in the table below were established by evaluation of the registered sound levels. In this process, only those sections of the measuring tape were used for the evaluation which did not contain any perceptible influence from background noise in the near vicinity (e.g. from passing vehicles, aircraft flying overhead, animals or people). The table shows the levels that were established at distances of 1, 3, and 5 m.

Measurement No.	Maximum level L_{AFmax} dB(A)			Measurement No.	Maximum level L_{AFmax} dB(A)		
	1 m	3 m	5 m		1 m	3 m	5 m
1	66.3	58.9	55.8	13	65.7	57.7	54.7
2	66.5	61.7	54.6	14	64.4	57.1	54.5
3	63.6	60.5	54.2	15	66.4	61.7	54.6
4	67.0	62.1	55.8	16	65.6	57.8	54.2
5	64.0	57.8	54.4	17	66.6	63.4	56.3
6	66.2	64	56.4	18	68.1	59.5	55.5
7	65.6	58.6	55.7	19	64.4	58.7	56.8
8	68.3	63.3	56.0	20	66	61.7	57.3
9	64.7	58.7	54.9	21	66.6	60.8	54.8
10	67.5	60.4	56.5	22	65.9	62.7	51.6
11	63.7	57.8	52.9	23	62.2	57.7	53.6
12	67.6	61.6	58.0	24	62.3	55.0	53.2

Table 2: Measurement results

[1] The speed of an average full instep kick from the rest position is approx. 80 km/h.

An average maximum sound level was calculated from the above measured values for the three distances (1 m/3 m/5 m) $\overline{L_{AFmax}}$ = 66/60/55 dB(A). The maximum level which occurred during the measurements amounts to L_{AFmax} = 68/63/58 dB(A).

Only the sound of the tyre striking the rope net occurred during the measurement. Rattling noises in the area of the rope net fixings or noise caused by vibration of the posts were not detected.

Therefore the peaks in the sound level are only attributable to the tyre striking the net. This means that a point sound source can be assumed in the further considerations contained in this report.

5 Assessment

The noise emissions from **sources in the open air** are generally described in terms of sound power levels L_{WA} according to DIN 45635, which are calculated based on the following formulae:

$$L_{WA} = L_{AFm} + 10 \cdot \lg (S / 1\ m^2)$$

or in the case of hemispherical sound radiation

$$L_{WA} = L_{AFm} + 20 \cdot \lg (s_m / 1\ m) + 8$$

with L_{AFm} the average sound pressure level on the enveloping measuring surface or at a defined distance
S Size of the enveloping surface
s_m Average distance of the measuring point from the source.

In the present case there is therefore a maximum sound power level of:

$$L_{WAmax} = 58\ dB(A) + 20 \cdot \lg (5\ m / 1\ m) + 8$$
$$= 79\ dB(A)$$

Communal football pitches and multi-functional play and games areas where ball catch fences are erected are generally only used during the day. Therefore, in oder to fufil the provisions of the

> *18th Ordinance for implementation of the Federal Immission Control Act (Sports facilities noise control ordinance (**18. BImSchV**) of 18.07.199*
> (Verordnung zur Durchführung des Bundesimmissionsschutzgesetzes (Sportanlagenlärmschutzverordnung - (**18. BImSchV**) vom 18.07.1991)
> *Federal Law Gazelle 1991, Part 1, Page 1588 .. 1596*
> (BGBl. 1991. Teil I. S. 1588 .. 1596)

sports facilities in residential areas must maintain a guide decibel value of 45 dB(A) during the day during the officially-recognised rest and quiet periods. This guide value may be exceeded for individual short-term noise peaks by not more than 30 dB(A). This requirement can already be met at a distance of 1m if only the peak levels which occur when a ball strikes the fence are considered. This means that in the present case, noise peaks which occur when the ball strikes the rope net do not exceed the permissible guide values contained in the above regulation, even if there is only a small distance between the ball catch fence and the residential area which is to be protected against excessive noise.

Average noise values, e.g. regarding the use of a communal football pitch during the entire day, depend on the number of noise events arising from the ball striking the fence and therefore also depend on the type and extent of use as well as the distance away of the impact point. It is therefore not possible to make statements in this regard within the framework of this measuring report.

Annexes

Annex 1 System as a whole

Annex 2 Photo documentation

Photo No.	1	Type plate

Photo No.	2	Measuring rig

Photo No.	3	Detail of fixing

Photo No.	4	Impacting body