

INSTITUT FÜR SPORTBODENTECHNIK

IST Consulting GmbH



Staatssekretariat für  
Wirtschaft SECO  
SAS Schweizerische  
Akkreditierungsstelle  
ISO 17025 STS 411



SMG Sportplatzmaschinenbau GmbH  
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Eschenz, 25<sup>th</sup> June 2013

IST Reference no. 8190/HJK

Subject Wear of pile fibres of artificial turf  
by maintenance equipment.

The IST was commissioned to investigate and assess the wearing effect of maintenance equipment on the pile fibres of artificial turf in accordance with EN 15330-1.

### Test facility

For this purpose, the company SMG developed a test platform on which 4 different synthetic turf products could be positioned at the same time. The platform has a diameter of 4m and is motor driven to rotate around its centre. Above the platform, a brush with nylon bristles is installed at a diagonal transverse beam, which corresponds to those of the SMG-maintenance equipment. Next to it, a spike board has been mounted, which also corresponds to the SMG devices. Further inside, there is an analogue drag brush on the transverse beam. The arrangement of the test apparatus is shown in the photos of the annex.

Accredited testing laboratory according to SN EN ISO 17025 2005 by the Swiss Accreditation Service (SAS), the Swiss State Secretariat for Economic Affairs (SECO). The accreditation covers the test methods listed in the certificate.

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The rotation speed of the brush (diameter 30 cm) is 300 r / min according to the setting of the SMG maintenance equipment.

The brush is adjusted so that it engages 5mm deep into the infill.

The rotational speed of the platform is 1/68 r / s. This corresponds to a speed of approx. 0.185 m / s and 0.67 km / h at the periphery. In contrast, the maintenance equipment of the company SMG has a speed of about 10 km / h.

In order to compare the loading of the testing device with the real maintenance equipment, the number of turns of the brush is to be calculated based on 1m of the maintenance route. At a speed of 10 km / h, the maintenance equipment travels this distance within 0.36 seconds. This corresponds to  $0.36 * 300/60 = 1.8$  turns per 1 m. However, the test platform travels this testing route within 5 s. This results in  $5 * 300/60 = 25$  turns per 1m.

The stress intensity in turns per 1 m differs by a factor of 14. Thus, the turf is exposed to 14 times of stress during one turn of the platform, such as with a real maintenance equipment. In other words, this means that 1 turn of the test platform simulates 14 maintenance runs. If it is assumed that 23 maintenance runs are performed on a synthetic turf field per year, about 3 turns will represent - taking an overlap factor of 1.5 into account - the mechanical stress of 1 year of real maintenance.

### **Performance of the test**

For the assessment of the mechanical wearing effect, in particular of the brushes, 4 different artificial turf products have been laid out on the platform (each a quarter-sector). These were branded products with a pile fibre length of 40mm and SBR infill. The free fibre length amounted to approx. 15mm.

The test platform was turned 32 times in total, whereas the three maintenance devices were always engaged with the pile layers of the granular material. After 4, 16 and 32 turns, the height of the infill was measured and the condition of the pile fibres photographically documented.

The resulting visual quality results from the photos in the annex.

### **Evaluation**

The investigation was performed based on the claim made by some manufacturers of artificial turf that the wear of the pile fibres is due to intensive maintenance with aggressive maintenance equipment on many sites. The test on the rotary platform should show whether this is true.

On the one hand, it is necessary to brush the pile fibres of the surfaces regularly - also according to the intensity of use - thus to maintain consistently both the visual appearance (aspect) and the sport functional properties (ball roll behaviour, ball reflection) as long as possible. Actually, this has only been caused by brushing with rotating brushes (against the direction of rotation) and not actually with pure drag brushes.

According to the above considerations, the use of artificial turf samples with the rotating platform can be interpreted such that 3 turns of the platform correspond to a real stress of 1 year.

After 32 turns of the platform, the pile fibres of none of the four tested products showed any visually detectable modifications.



Dipl.-Ing. Hans-Jörg Kolitzus



**Pictures in the annex**

**Annex 1 of 5 report # 8190 dated 25 June 2013**

First picture: Rotation platform with maintenance devices

Second picture: Rotation brush with opened sheeting

**Annex 2 of 5 report # 8190 dated 25 June 2013**

First picture: Maintenance devices / front view

Second picture: Spike facility

**Annex 3 of 5 report # 8190 dated 25 June 2013**

First picture: Surface after 16 turns

Second picture: Surface after 32 turns: rotation brush  
Surface 1

**Annex 4 of 5 report # 8190 dated 25 June 2013**

First picture: Surface after 32 turns: rotation brush  
Surface 2

Second picture: Surface after 32 turns: rotation brush  
Surface 3

**Annex 5 of 5 report # 8190 dated 25 June 2013**

Picture: Surface after 32 turns: rotation brush  
Surface 4

*I, Uta Ritschel, certified interpreter / authorized translator for English and French, appointed by the president of the Potsdam Regional Court, hereby certify that the above translation from the original is accurate and complete.  
Potsdam, Germany, 22 July 2013*

*Uta Ritschel  
Certified Interpreter / Authorized  
Translator for English and French,  
appointed by the President of  
the Potsdam Regional Court*



Rotations-Plattform mit Pflegegeräten



Rotationsbürste mit geöffneter Verschalung



Pflegegeräte von vorn

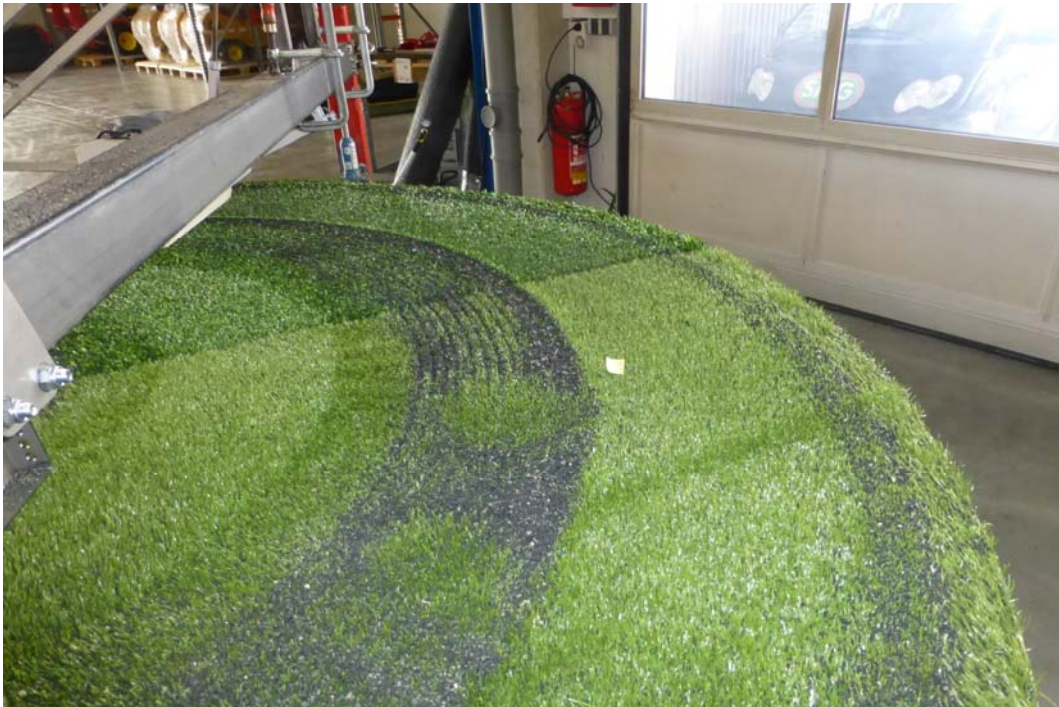


Zinkenbalken





Belagsoberflächen nach 16 Umdrehungen



Belag nach 32 Umdrehungen: Rotationsbürste

Belag 1





Belag nach 32 Umdrehungen: Rotationsbürste

Belag 2



Belag nach 32 Umdrehungen: Rotationsbürste

Belag 3



Belag nach 32 Umdrehungen: Rotationsbürste

Belag 4

