

**PROGNME**



by **TROCELLEN**

# TAILOR MADE SHOCK PADS

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**Norwegian Artificial Grass Seminar 2024**

Oslo, September 10th, 2024



# Agenda

## Norwegian Artificial Grass Seminar 2024

- 1 Introduction
  - a. Trocellen
  - b. ProGame
  - c. References
- 2 Standards in Europe
  - a. EN 15330-4 for Shock Pads
  - b. Examples – individual counties  
KNVB/NF/LND/BS
- 3 Environmental Footprint of Shockpads
  - a. PEFCR
  - b. others
- 4 Contact

# 1

## About TROCELLEN

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- Company Facts
- Global Presence
- Business Units

# Company Facts Trocellen GmbH

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**Starting Point**  
1972



**Owner**  
Furukawa Electrics



**Employees**  
600



**Turnover**  
approx. EUR 120 Mio (2022)

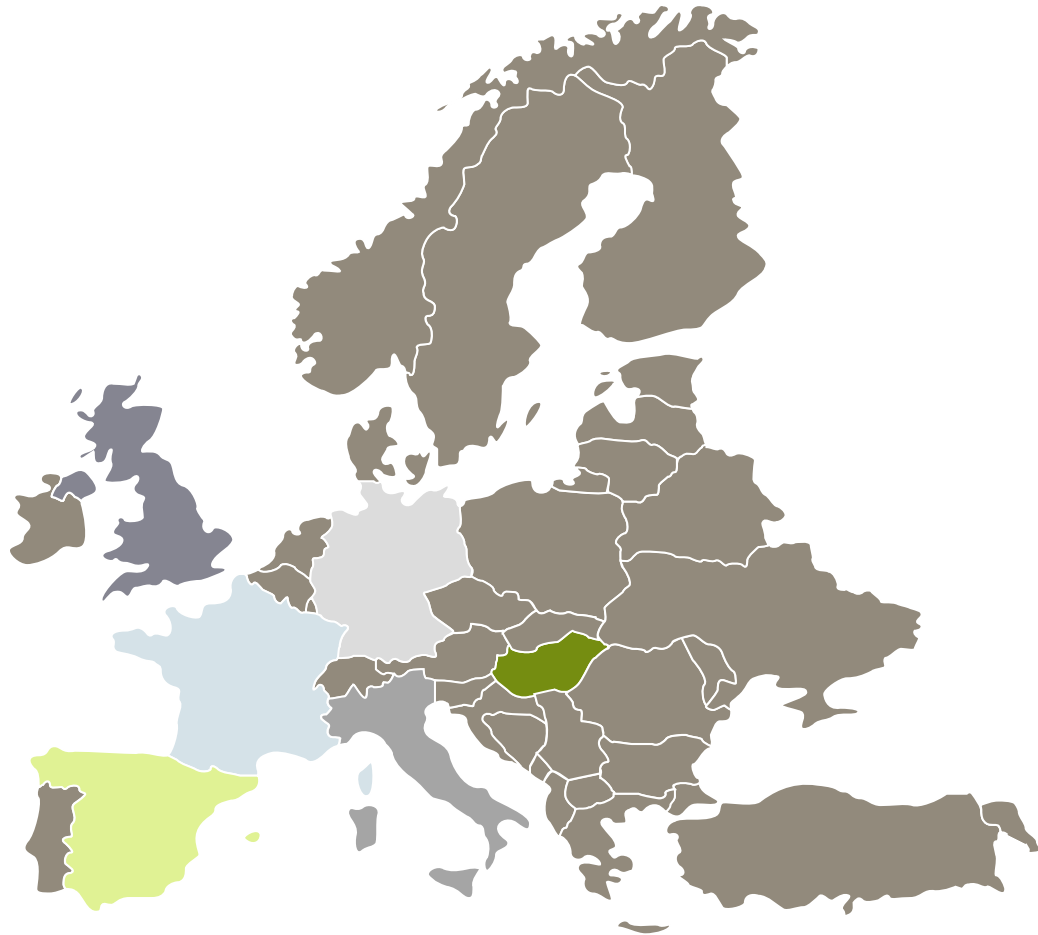


**Factories**  
6 worldwide



**Business Units**  
10

# Global Presence



## European Plants:



Germany

Troisdorf (headquarter),  
Cologne area



Italy

Caponago,  
Milano area

Volpago,  
Venetian area



Spain

Alcala de Henares,  
Madrid area



Hungary

Budapest

## Sales Offices:



France

Coigni res,  
Paris area



United Kingdom

Scarborough,  
North Yorkshire

# Global Presence



|              |                    |
|--------------|--------------------|
| President:   | Mitsuyoshi Shibata |
| Founded:     | 1884               |
| Employees:   | 52.215             |
| Headquarter: | Tokyo, Japan       |
| Turnover     | ~ 8.5 Billion EUR  |

## Asian Plants:



Malaysia

Telok Panglima Garang,  
Kuala Lumpur area

# Business Units

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Industrial  
Solution



Adhesives  
Tapes



Insulation



Automotive



Tro-Chips



Industrial  
Foams



Sport, Home,  
Leisure



Footwear



Packaging



ProGame

# BU ProGame - History



2007

First m<sup>2</sup> of XC Shock Pad sold in Europe

2010

ProGame brand was established under Trocellen Germany

Invention of XC Plus, Shock Pad for lateral drainage

2014

XC production started in Trocellen **Malaysia**

Reached 5 million m<sup>2</sup> of ProGame Shock Pad sold worldwide

2017

XC production started in Trocellen **Italy**

Reached 10 million m<sup>2</sup> of ProGame Shock Pad sold worldwide

2019

XC product patent worldwide



European Patent Office under the number EP07821579

2020

Introduction of BIO based products – sustainability road map

2023

1<sup>st</sup> installed FIH Dry Hockey pitch worldwide on 9006 XC



2024

Reached 20 million m<sup>2</sup> of ProGame Shock Pad sold worldwide

# ProGame - Facts

Years of experience and a high amount of produced square meters are proof of our success.



75+

Countries

20+

Years

2000+

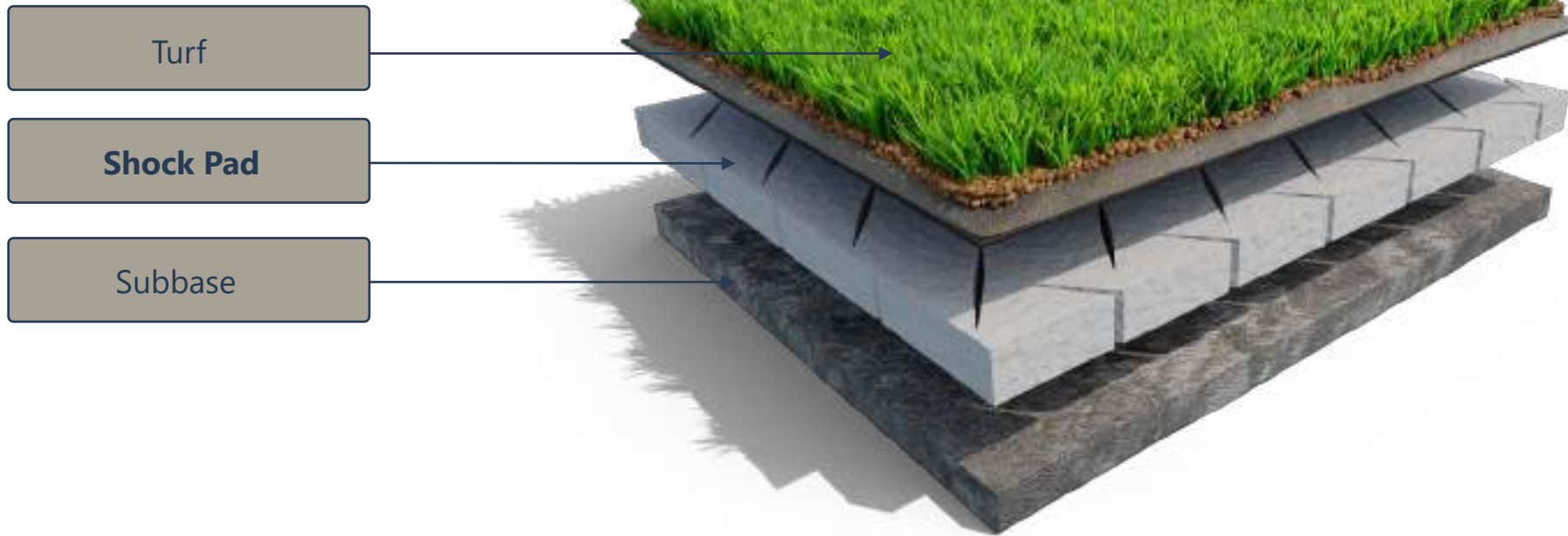
Pitches

20M+

m2

# Sport: XC Shock Pads

## System Composition



## Technical Details

Density  
**50–90 kg/m<sup>3</sup>**

Thickness  
**6–14 mm**

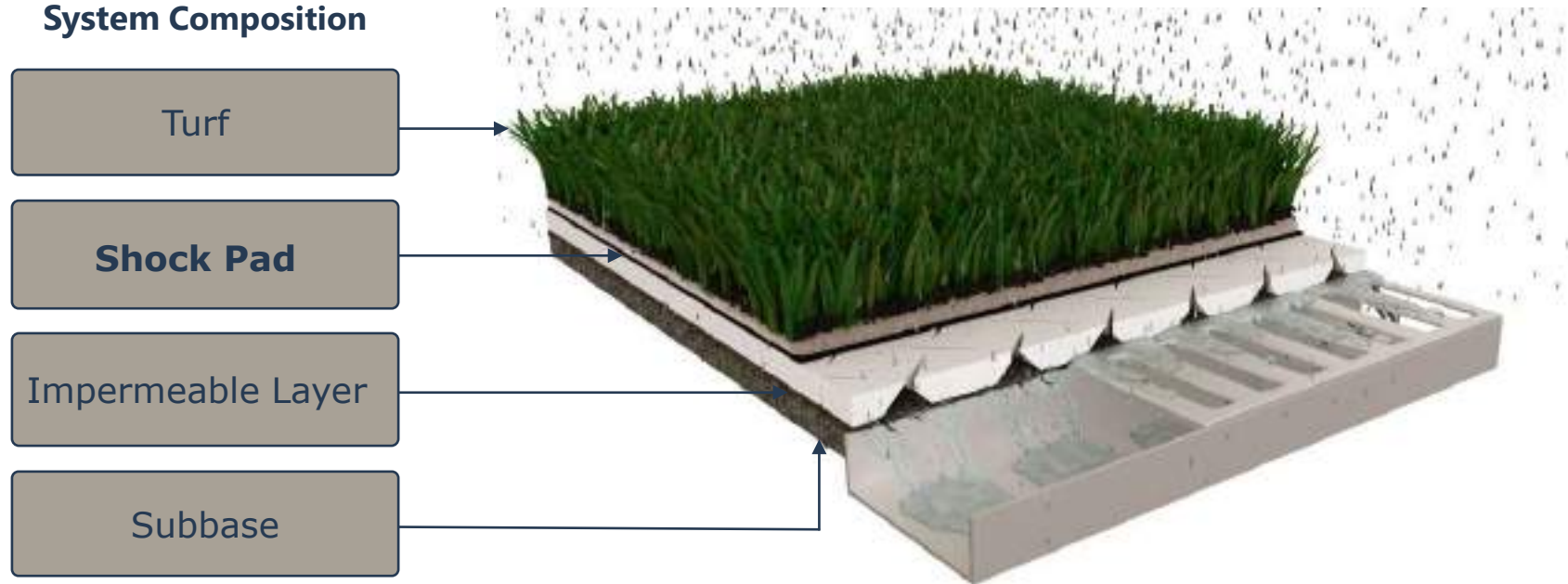
Shock Absorption  
**25–60 %**

Vertical Deformation  
**4,1–8 mm**

Water Permeability  
**12500 mm/h**

# Sport: XC Plus lateral drainage Shock Pads

## System Composition



## Technical Details

Density  
**50/70 kg/m<sup>3</sup>**

Thickness  
**10/12/14 mm**

Shock Absorption  
**35–48 %**

Vertical deformation  
**6,4–8 mm**

Lateral Drainage  
**1,57 | 3,71 l/m\*h**

# References and Projects

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## Projects in Scandinavia:

### Norway (68 installations)

- Kloterenga ( Oslo – C 05012 XC )
- Domus Athletica ( Oslo – C 05010 XC )
- SPK Hager ( Haugesund – C 05010 XC )
- Kristiansand ( Goe-IP Infill – C 05012 XC )

### Projects for a turf re-installation on our pad:

- Kilmarnock FC (Scottish Premiership)
- Hellmond (Football training pitch, Netherlands)
- Gretna FC (Scottish Lowland League)



# 2

## Standards in Europe for Shock Pads

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- Overview
- EN 15330-4
- Examples from other countries

# Standards for Shock Pads in Europe

**Product testing** on Shock Pads according:

- ✓ EN 15330-4
- ✓ EN 15330-1
- ✓ NF P90-112 (French norm)
- ✓ KNVB - NOC-NSF (Dutch manual)
- ✓ LND (Italian norm)
- ✓ Nordic Norm

## Results:

- Performance (SA & VD)
- Dimensional stability
- Tensile strength
- Water permeability
- Durability
- Lateral drainage
- Toxicology and Environment compatibility



# EN 15330-4 Development



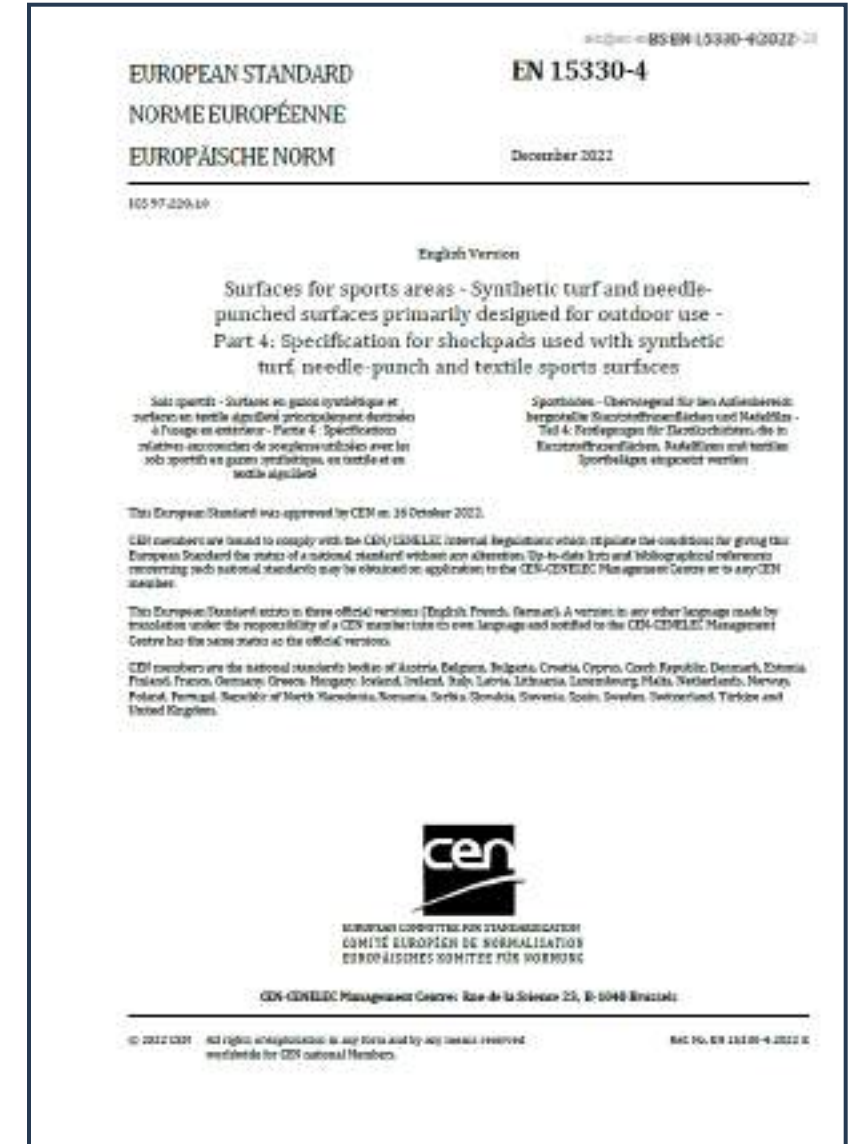
ESTC – taking the lead in setting standards

# EN 15330-4

## Scope

This document specifies minimum performance and durability requirements for shockpads used within synthetic turf and textile sports surfacing systems.

The document also specifies appropriate performance tolerance for production and on-site quality control procedures.



# EN 15330-4

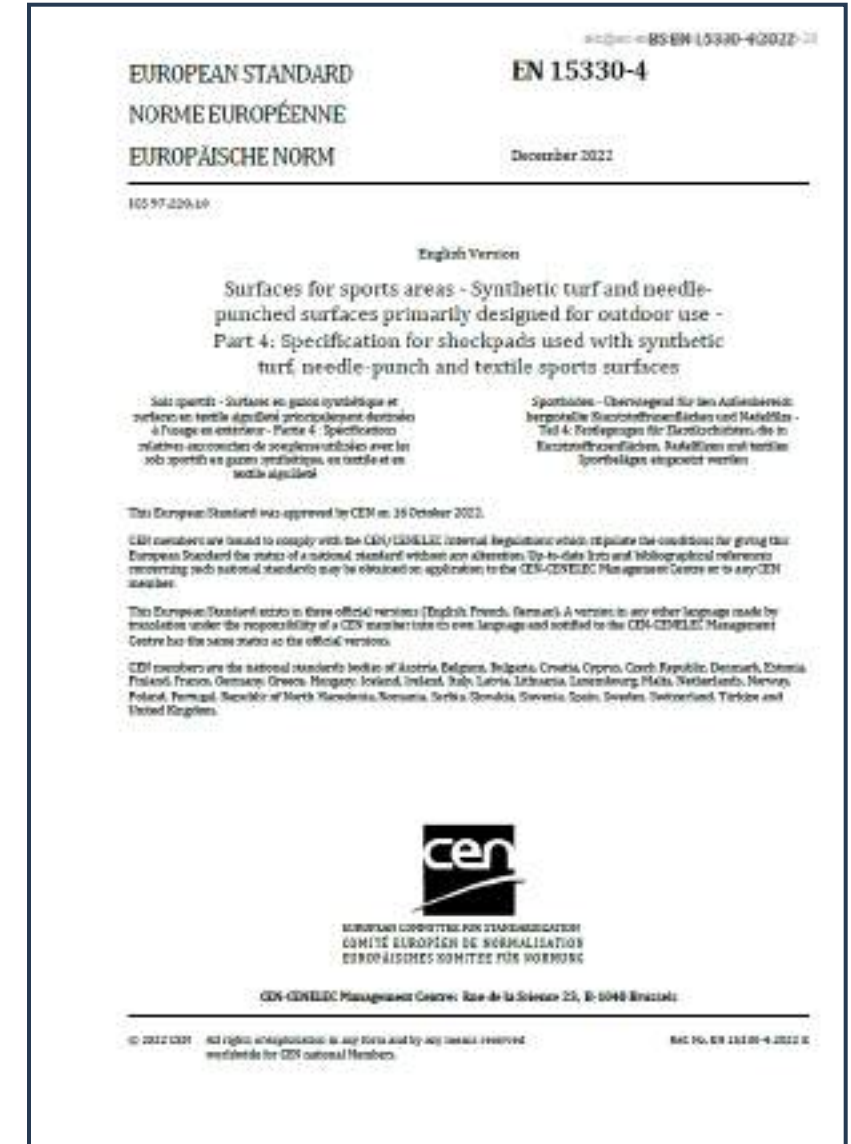
## What types of products are covered

The Standard applies to all types of shockpad used within sports fields:

- Pre-fabricated rolls
- Pre-fabricated tiles
- Bound rubber granulate insitu shockpads
- Bound rubber granulate aggregate elastic layers
- Fibre and textile shockpads

To be considered as a shockpad, a product needs to provide shock absorbency of at least 20% (AAA).

The standard does not apply to structural drainage cells or consider the structural performance of some combined drainage cells/shockpads



# EN 15330-4

## Product Identification

The EN report clearly identifies the product tested in laboratory. Stating the product name, the manufacturer and a picture of the product.

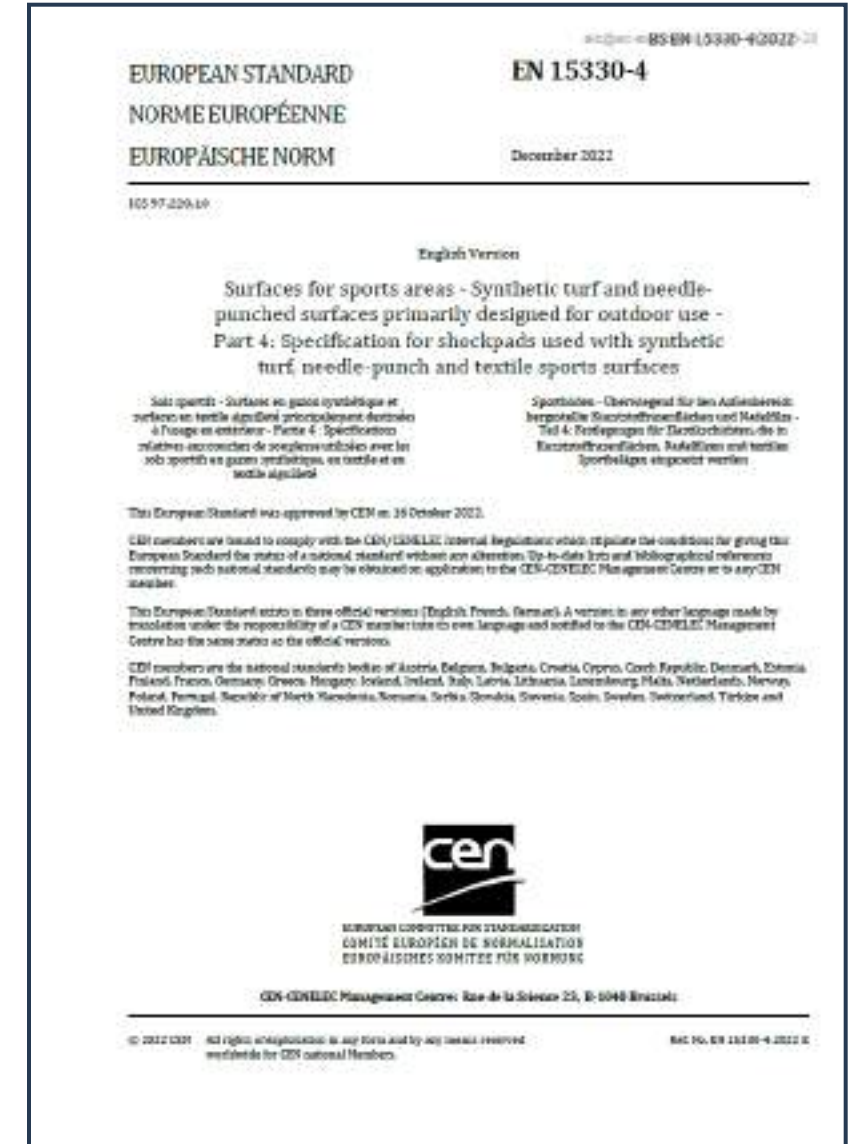
This together with the physical properties of the product listed afterwards leads to a clear and unique product identification.

| EN 15330-4 Shockpads - Laboratory Test Report                                       |                                      |                                                                                     |             |
|-------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|-------------|
| Report Number: 13358/8623                                                           |                                      |                                                                                     |             |
| Product Description                                                                 |                                      |                                                                                     |             |
| Product Name:                                                                       | ProGame 5012 XC-Cut                  |                                                                                     |             |
| Product Type:                                                                       | Prefabricated shockpad               |                                                                                     |             |
| Product Description:                                                                | Cross-linked polyolefin foam         |                                                                                     |             |
| Nominal Thickness:                                                                  | 12 mm Foam + non-woven textile layer |                                                                                     |             |
| Substrate:                                                                          | Rigid Engineered Base                |                                                                                     |             |
| Sample Image (Plan View):                                                           |                                      | Sample Image (End Elevation):                                                       |             |
|  |                                      |  |             |
| Sample Reference                                                                    |                                      |                                                                                     |             |
| Laboratory Job No.                                                                  | 13358                                | Date Received                                                                       |             |
| Sample Reference No.                                                                | Shockpad                             | 8623                                                                                | 08/03/2023  |
| Ambient Temperature Range During Testing                                            |                                      | 21.0 – 25.0 °C (unless otherwise stated)                                            |             |
| Ambient Humidity Range During Testing                                               |                                      | 40 – 60 %                                                                           |             |
| Physical Properties                                                                 |                                      |                                                                                     |             |
| Property                                                                            | Test Method                          | Test Condition                                                                      | Mean Result |
| Thickness                                                                           | EN 1969:2000 Method A                | As supplied                                                                         | 13.2 mm     |
| Mass per unit area                                                                  | ISO 8543: 2020                       | As supplied                                                                         | 751 g/m2    |
| Physical Properties of Prefabricated Foam and Foam Chip Shockpads                   |                                      |                                                                                     |             |
| Chemical Composition                                                                | ISO 11957-3:2018*                    | As supplied                                                                         | Polyolefin  |
| Volume Weight                                                                       | ISO 845:2006*                        | As supplied                                                                         | 56.9 kg/m3  |
| * Not all tests carried out are within our scope of ISO 17025 accreditation.        |                                      |                                                                                     |             |

# EN 15330-4

## Performance requirements

- Shock absorption
  - Tests @ 23°C, 40°C, and 5°C
  - Optional test at -5°C on wet (frozen) sample
  - Results classified based on performance over temperature range
- Vertical Deformation
- Water permeability
- Vertical infiltration
- Horizontal drainage (optional)
- Tensile properties
- Determination of dimensional stability
- Resistance to dynamic fatigue by repeated pounding
- Resistance to Permanent Deformation after short-term loading
- Resistance to Permanent Deformation after Static Loading
- Thermal conductivity
- Product properties



# EN 15330-4 conclusion

Shock pads which comply with the new norm – are extensively tested on performance, longevity and to the toxicology and environment compatibility in laboratory.



**High quality and long-lasting products which also comply with international rules and bodies such as FIFA and FIH**

**Will the European countries (municipalities) adopt the new norm ?**



# National Standards for Shock Pads

## Italian Norm

LND – Lega Nazionale Dilettanti

Product certification and lab tests according national norms and EN norm.



## French Norm

NF P90-112: Sports grounds – Synthetic turf surfaces for outdoor sports areas

Laboratory tests on shock pad for synthetic turf acc. To EN 15330-1 and national NF standard.



## Dutch Manual from KNVB

Manual for artificial turf football pitches only.

Laboratory and Field requirements for turf systems and components (close to FIFA manual 2015)



# National Standards for Shock Pads

## Scandinavian Norm

Nordic Test Certificate

Product identification laboratory tests of system and components according EN standards. Compliance with supplier declaration.

| NORDIC TEST CERTIFICATE                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| VALID FOR SWEDEN, NORWAY, DENMARK, ICELAND, FEROE ISLANDS, FINLAND                                                                                       |  |
| All tests hereafter are based on EN- Standards also used by FIFA<br>Etterfølgende tester er basert på EN-Standarder også benyttet av FIFA                |  |
| Turf system producer<br><small>Kunstgressprodusent</small>                                                                                               |  |
| Turf product (brand name)<br><small>Kunstgressets navn (varemerke)</small>                                                                               |  |
| Turf product (code)<br><small>Kunstgressets typebetegnelse</small>                                                                                       |  |
| Test applicant<br><small>(address, phone, e-mail)<br/>Søkers navn, adresse, telefon mm.</small>                                                          |  |
| TURF COMPOSITION<br>KUNSTGRESSETS OPPBYGGING                                                                                                             |  |
| Product / System declaration of the turf manufacturer, refer to pages 3 to 5<br>Kunstgressprodusentens deklarasjon av kunstgress-systemet (jf. side 3-5) |  |

## Football Foundation (England)

AGP Framework paper (mandates EN 15330-4)

Specifies the performance and material requirements for the synthetic turf surfacing systems laid on any synthetic turf football pitch

|                                                                                                                                                                                                                                                    |                         |    |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----|--|
| 5                                                                                                                                                                                                                                                  | AGP Framework 2024-2028 |    |  |
| Employer's Requirements                                                                                                                                                                                                                            | Football Turf           | V1 |  |
| <b>Introduction</b><br>This section of the Employer's Requirements specifies the performance and material requirements for the synthetic turf surfacing system laid on any synthetic turf football pitch procured via the AGP Framework (2024-28). |                         |    |  |
| 1. Intended usage                                                                                                                                                                                                                                  |                         |    |  |

# National Standards for Shock Pads

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## General

European standards need to be regularly and are normally adjusted to modern/new ways of construction. That means the test reports needs to be renewed every couple of years.

The new EN 15330-4 as well as the new FIFA manual and FIH manual requires producer names, product name and pictures of the shock pad.

*It is up to the end customer to verify that which systems/components were specified in the tender are also matching with the products arriving on-site for installation.*

# 3

## Environmental Footprint of Shock Pads

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- PEFCR method for the future
- Existing LCA studies

# PEFCR method (near future)

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The introduction of PEFCR will make difficult LCA calculation's not easy – but the results at least comparable.

End customers will be able to compare the environmental footprint of different artificial turf systems and their components because of a standardized calculation method.

# LCA studies – so far

Until today there are two LCA (life cycle analyses) studies on the market, which were done in the last years.

-**University Zurich:** “Life Cycle Assessment of Artificial and Natural Turf Sports Fields” from 2020

-**Fraunhofer Institute:** “Artificial Turf Pitches – System Analysis” from 2021

-**Dutch National Environmental Database:** “LCA Reporting category 3 data Chapter 71 - Artificial grass pitches, upper structure (artificial mats and shock pads)” MKI from 2023

The methods of calculating the environmental impact differ in these studies, that's why the results are not comparable between the studies. But first trends can be concluded staying within each study.



# MKI – Netherlands (Environmental Cost Indicator)

The Dutch LCA calculation from 31.12.2023 give a good overview of different products with its weighted single score value “MKI” or environmental cost indicator in Euro/m<sup>2</sup>!

PE foam shock pads do have the smallest environmental footprint compared to other available shock pad solutions in the market.

Results on MKI per product per module:

|                                     | A1-A3 | A4    | A5    | B1    | B2    | B3    | B4    | C1    | C2    | C3    | C4    | D      | Total |
|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| Artificial turf PE 40 mm fibre (EU) | 0,734 | 0,020 | 0,050 | 0,000 | 0,163 | 0,000 | 0,000 | 0,001 | 0,002 | 0,135 | 0,000 | -0,186 | 0,919 |
| Artificial turf PE 40 mm fibre (CN) | 0,772 | 0,132 | 0,146 | 0,000 | 0,163 | 0,000 | 0,000 | 0,001 | 0,002 | 0,135 | 0,000 | -0,186 | 1,166 |
| Artificial turf PP 40 mm fibre (EU) | 0,691 | 0,020 | 0,049 | 0,000 | 0,163 | 0,000 | 0,000 | 0,001 | 0,002 | 0,135 | 0,000 | -0,186 | 0,875 |
| Artificial turf PP 40 mm fibre (CN) | 0,729 | 0,132 | 0,145 | 0,000 | 0,163 | 0,000 | 0,000 | 0,001 | 0,002 | 0,135 | 0,000 | -0,186 | 1,121 |
| reuse mat                           | 0,000 | 0,006 | 0,017 | 0,000 | 0,163 | 0,000 | 0,000 | 0,001 | 0,002 | 0,135 | 0,000 | 0,000  | 0,324 |
| Artificial turf non-infl            | 1,143 | 0,093 | 0,046 | 0,000 | 0,114 | 0,000 | 0,000 | 0,001 | 0,003 | 0,229 | 0,000 | -0,316 | 1,355 |
| Artificial turf Hockey PE (EU)      | 1,048 | 0,029 | 0,040 | 0,000 | 0,114 | 0,000 | 0,000 | 0,001 | 0,003 | 0,199 | 0,000 | -0,274 | 1,159 |
| Artificial turf Hockey PE (CN)      | 1,048 | 0,194 | 0,045 | 0,000 | 0,119 | 0,000 | 0,000 | 0,001 | 0,003 | 0,199 | 0,000 | -0,274 | 1,334 |
|                                     | A1-A3 | A4    | A5    | B1    | B2    | B3    | B4    | C1    | C2    | C3    | C4    | D      | Total |
| E-layer 25 mm                       | 4,706 | 0,121 | 0,171 | 0,000 | 0,000 | 0,000 | 0,000 | 0,001 | 0,012 | 0,828 | 0,000 | -1,142 | 4,696 |
| E-layer 15 mm                       | 3,138 | 0,081 | 0,115 | 0,000 | 0,000 | 0,000 | 0,000 | 0,001 | 0,008 | 0,552 | 0,000 | -0,761 | 3,133 |
| Foam PU 30mm                        | 0,362 | 0,024 | 0,018 | 0,000 | 0,000 | 0,000 | 0,000 | 0,001 | 0,002 | 0,166 | 0,000 | -0,037 | 0,536 |
| Foam PE 30mm                        | 0,187 | 0,005 | 0,008 | 0,000 | 0,000 | 0,000 | 0,000 | 0,001 | 0,001 | 0,034 | 0,000 | -0,048 | 0,188 |
| Recycled foam 17 mm                 | 0,184 | 0,021 | 0,012 | 0,000 | 0,000 | 0,000 | 0,000 | 0,001 | 0,002 | 0,143 | 0,000 | -0,047 | 0,316 |

\*MKI LCA Reporting category 3 data National Environmental Database – 31.12.2023  
Chapter 71 - Artificial grass pitches, upper structure (artificial mats and shock pads)

# Trocellen ProGame - Sustainable Partner

ProGame shock pads are by nature a **sustainable product**, the very **low weight and volume**, combined with the **durability**, are a great advantage for the environment. However, we are working to further reduce our environmental footprint by several actions.



## Key-actions to further reduce our environmental footprint:

- measuring current environment footprint, measure it with the aim to reduce it!  
*active participation to the PEFCR project with EU and ESTC.*
- introduction of BIO based foam which lowers significantly the CO2 emissions.
- replace virgin PE with recycled PE aimed to have a new range of products with low CO2 impact.
- actively working on End of Life of the shock pad. Targets are pyrolysis and agglomeration of the product.

# 4

Contact

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# Contact

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