

Technical Notebook

LAYING SYNTHETIC GRASS

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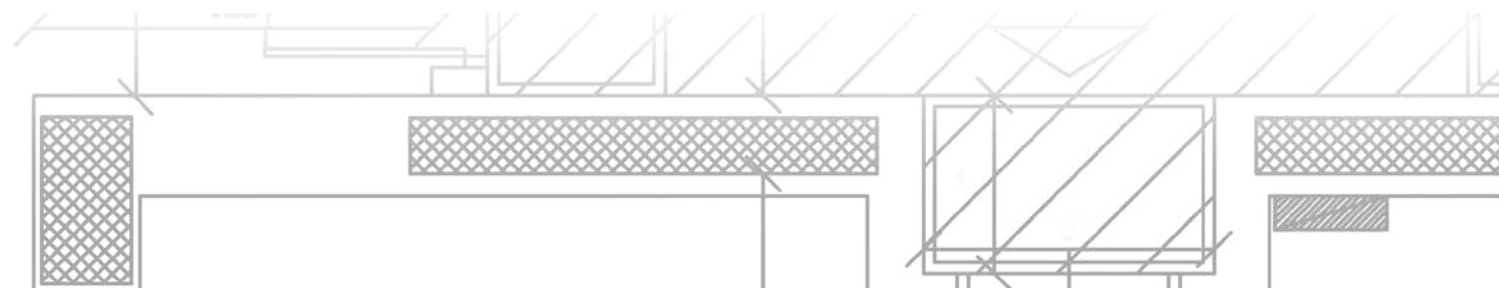


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1. INTRODUCTION

The advanced technology and in-depth studies now available have led industry to “get involved” in this sector, by introducing a valid, concrete alternative to natural grass playing fields: SYNTHETIC GRASS.

FIFA and UEFA have been following this project very closely for a number of years, and found themselves on the same wavelength when a new set of regulations were introduced in March, 2006.

The Italian National Amateur League (LND) was also quick to accept the new approach, and offered the services of their organisation as a sort of “pioneer” for this innovation. In fact, it is the only organisation in Italy which has the right to approve pitches made using artificial grass, and of releasing a “Seal of Approval” for carrying out amateur and competitive games.

A technical innovation to overcome the effect of the atmospheric inconveniencies typical in winter, to limit maintenance costs and to avoid long periods of inactivity of pitches, all of which is proving to be of great help to soccer at youth and amateur levels.

One of the main advantages which may be attributed to synthetic grass pitches is the increased stability of their characteristics, even under extreme climatic conditions. For example, during the winter, when temperatures often fall to around, or even below, freezing point, natural grass pitches tend to become very hard. The performance characteristics of synthetic grass pitches, on the other hand, remain practically unchanged.

MAPEI has always stood out for their commitment to the world of sport. Also in this case, thanks to their collaboration with Sport Service MAPEI in Castellanza, and with the main leading companies for the production of synthetic grass, not only have they been committed to the development of products and systems based on advanced technology, but also in the technical-performance assessment of synthetic grass-adhesives systems.



Resistance tests on the joints in synthetic grass surfaces carried out using the direct stress method, according to EN 12228 European Standards



Application of ULTRABOND TURF PU 1K on the jointing tape, via extrusion from its aluminium package



Positioning synthetic grass rolls



Spreading adhesive on ULTRABOND TURF TAPE 100 using a notched trowel



Laying the ULTRABOND TURF TAPE 100 jointing tape



Bonding the edges of the synthetic grass rolls

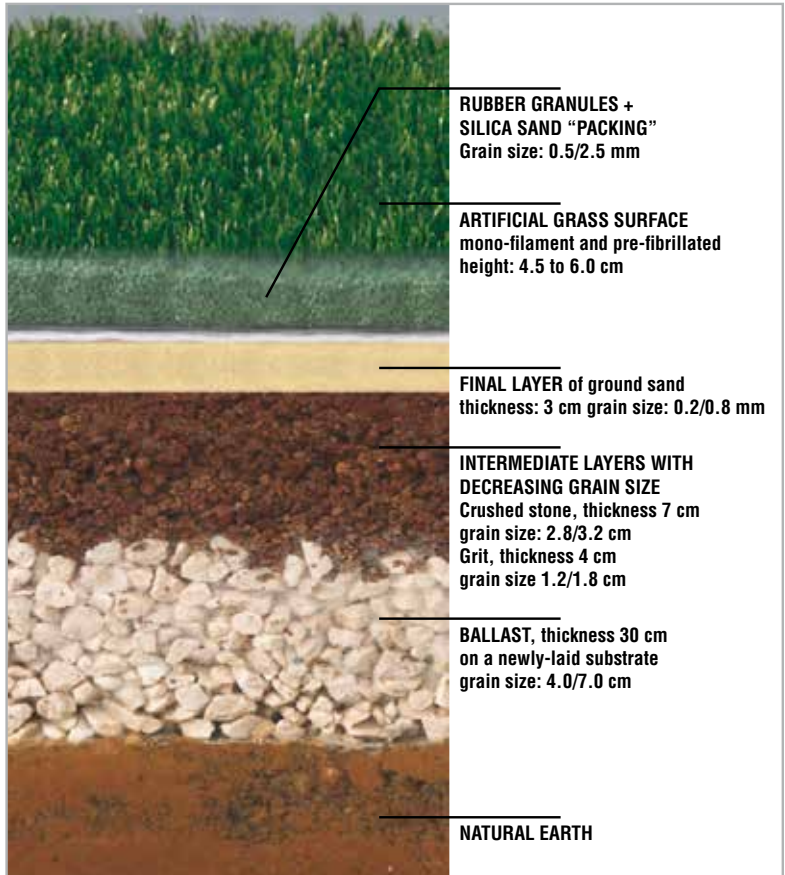
2. CREATING A SYNTHETIC GRASS PITCH

2.1 THE SUBSTRATE

The substrate of a synthetic grass pitch may be made using various techniques, and without a doubt this is the element which makes the difference between one pitch and another.

The surface which sustains the rolls or panels of grass must be perfectly level, have good drainage properties and have the right slope to allow water to flow off, according to the technical specifications laid down by the various governing bodies (FIFA, UEFA and LND).

The picture to the side illustrates an example of a newly-installed, stabilised substrate, as required by the LND for certifying pitches in Italy.



Stratigraphy of a newly-installed stabilised substrate

2.2 ARTIFICIAL GRASS LAYER LAYING TECHNIQUE

Once the drainage work has been completed and the various layers of the substrate have been installed according to the slope required, the artificial grass surface may be laid.

The single panels must be acclimatised by unrolling them a few hours before starting laying operations, and must be spread out to allow internal stresses caused by the packaging to be reduced.

Once laying has been completed, the joints must be bonded using **ULTRABOND TURF TAPE 100** special 40 cm-wide jointing tape. Using a notched trowel or a special applicator, spread on **ULTRABOND TURF EP 2K** two-component epoxy-polyurethane adhesive, **ULTRABOND TURF PU 1K** single component polyurethane adhesive or **ULTRABOND TURF PU 2K** two-component polyurethane adhesive with very low emission of volatile organic compounds (certified as EC1 R by GEV Institut). It is important to apply the correct amount of adhesive to guarantee that the back of the synthetic grass panel is completely buttered and to avoid detachment. After bonding the edges and once the adhesive has set, the lines of the pitch may then be marked out. This operation is carried out by rolling out regulation-sized white lines with the same characteristics as the grass layer directly on top of the artificial grass surface.

The same system as for joining the edges of the rolls is used to fix the lines, with **ULTRABOND TURF TAPE 100** and one of the special adhesives chosen from **ULTRABOND TURF EP 2K**, **ULTRABOND TURF PU 1K** or **ULTRABOND TURF PU 2K**.

The pitch must then be packed with silica sand and organic rubber granules to stabilise the grass surface and to promote drainage of surface water, as prescribed by the various governing bodies (FIFA, UEFA and LND).

This kind of playing surface must withstand highly variable temperature ranges according to where they are situated; for example, at very low temperatures in North-East Europe, where the temperature may drop to as low as -20°C when in service, or in the Middle East, where the temperature



Spreading the adhesive with a manual applicator



Checking the buttering on the back of the grass surface



Bonding the edges of the synthetic grass with a manual applicator



ULTRABOND TURF adhesives for laying synthetic grass

may reach more than +40°C. This is why all MAPEI products are subjected to severe testing, such as bonding tests, tensile strength tests, ageing tests, etc. to guarantee the best performance possible in order to certify the playing field.

3. ULTRABOND TURF SYSTEM

MAPEI has a complete range of products available to create playing fields in synthetic grass.

ULTRABOND TURF SYSTEM is made up of:

- **ULTRABOND TURF TAPE 100:** Jointing tape for joining panels of synthetic grass and for marking out pitches for various sports activities;

and a complete range of adhesives, chosen according to the laying conditions and requirements of the layer.

- **ULTRABOND TURF EP 2K:** Two-component epoxy-polyurethane adhesive for bonding synthetic grass surfaces.

- **ULTRABOND TURF PU 2K:** Two-component, solvent and water-free polyurethane adhesive with very low emission of volatile organic compounds (certified as EMICODE EC1 R by GEV Institut) for bonding synthetic grass surfaces. Particularly recommended for use at low temperatures and for those subjects who are allergic to epoxy or epoxy-polyurethane products.

- **ULTRABOND TURF PU 1K:** Single component, polyurethane adhesive with very low emission of volatile organic compounds (certified as EMICODE EC1 R by GEV Institut) for bonding synthetic grass surfaces. Particularly recommended for those subjects who are allergic to epoxy or epoxy-polyurethane products.

It is particularly suitable for bonding at low temperatures. This adhesive is a single component ready-to-use product and does not require a catalyser. Therefore, it is easier to use and blending errors are avoided.

3.1 ULTRABOND TURF EP 2K

Two-component epoxy-polyurethane adhesive for bonding synthetic grass surfaces

ULTRABOND TURF EP 2K is a two-component adhesive, consisting of an epoxy-polyurethane polymer base and a fluid catalyser. When the two components are mixed together, a paste is obtained which is easy to apply. It may be used indoors or outdoors for bonding jointing tape, such as **ULTRABOND TURF TAPE 100**, between the panels of synthetic grass.

TECHNICAL CHARACTERISTICS

- Easy to apply
- Excellent rib stability
- Once hardened, it forms an extremely tough film
- High bonding strength on any support material

APPLICATION PROCEDURE

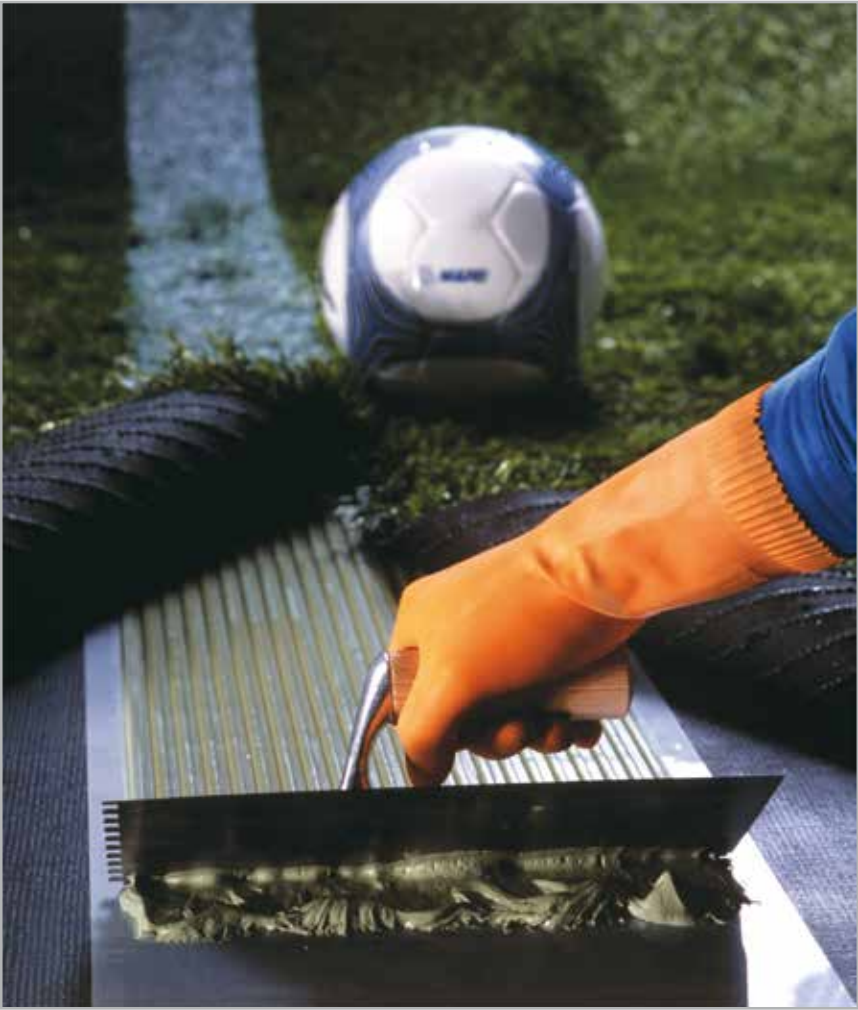
Before laying, make sure that the substrate has been prepared according to current norms and standards, and according to the final use of the pitch.

MIXING

The two components which make up **ULTRABOND TURF EP 2K** must be mixed at the correct ratio (A:B = 94:6). Any variation in this ratio will compromise correct reticulation of the product. Mixing must be carried out using a low-speed mechanical mixer, until a smooth paste with a uniform colour is obtained.

SPREADING THE ADHESIVE

Apply **ULTRABOND TURF EP 2K** on the **ULTRABOND TURF TAPE 100**. Spread the adhesive in order to completely butter the back of the synthetic grass panels.



ULTRABOND TURF EP 2K

LAYING THE PANELS

Follow the indications given by the manufacturer of the synthetic grass panels when laying the product. The panels must be applied on **ULTRABOND TURF TAPE 100** while the adhesive is still fresh (within 1 hour at normal temperatures).

If required, place weights on the panels along the joints to avoid irregularities in flatness.

TECHNICAL DATA (TYPICAL VALUES)		
Product details		
	COMPONENT A	COMPONENT B
Consistency:	thick paste	fluid liquid
Colour:	green	transparent
Density (g/cm³):	1.62	0.98
Dry solids content (%):	97	100
Brookfield viscosity (mPa-s):	37,000 (# 7 - RPM 50)	1,000 (# 2 - RPM 20)
Storage:	24 months in its original, unopened packaging	
Application data (at 23°C and 50% R.H.)		
Mixing ratio	component A : component B = 94 : 6	
Brookfield viscosità of mix (mPa-s):	30,000 (# 7 - RPM 50)	
Density of the mix (kg/m³):	1,510	
Pot life of the mix:	45 min.	
Permissible application temperature range:	from +10°C to +30°C	
Open time:	1 hour	
Start setting time:	after 6 hours	
End of setting time:	after 7 hours	
Set to light foot traffic:	after 12-24 hours	
Waiting time before putting into service:	7 days	
Final performances		
Tensile bonding between Ultrabond Turf Tape 100 and synthetic grass (N):	> 1,500	

LAYING SYNTHETIC GRASS

3.2 ULTRABOND TURF PU 2K

Two-component polyurethane adhesive for bonding jointing strips between panels of synthetic grass

ULTRABOND TURF PU 2K is a two-component polyurethane adhesive with very low emission of volatile organic compounds (certified as EMICODE EC1 R by GEV Institut), developed for bonding jointing tape between panels of synthetic grass (such as **ULTRABOND TURF TAPE 100**) both indoors and outdoors. It is characterised by its consistency which makes application of the adhesive particularly easy.

Available in rapid version, too (**ULTRABOND TURF PU 2K R**).

TECHNICAL CHARACTERISTICS

- Adhesive without either water or solvent
- Excellent rib stability
- May be used at low temperatures (down to 0°C)
- Particularly recommended for those subjects who are allergic to epoxy or epoxy-polyurethane products
- Once hardened, it forms an extremely tough film
- Certified by GEV Institut as EMICODE EC1 R (very low emission of volatile organic compounds)

APPLICATION PROCEDURE

Before laying, make sure that the substrate has been prepared according to current norms and standards, and according to the final use of the pitch.

MIXING

The two components which make up **ULTRABOND TURF PU 2K** must be mixed at the correct ratio (A:B = 90:10).

Any variation in this ratio will compromise correct reticulation of the product. Mixing must be carried out using a low-speed mechanical mixer, until a smooth paste with a uniform colour is obtained.



ULTRABOND TURF PU 2K



SPREADING THE ADHESIVE

Apply **ULTRABOND TURF PU 2K** on the **ULTRABOND TURF TAPE 100**. Spread the adhesive in order to completely butter the back of the synthetic grass panels.

LAYING THE PANELS

Follow the indications given by the manufacturer of the synthetic grass panels when laying the product. The panels must be applied on **Ultrabond Turf Tape 100** while the adhesive is still fresh (within 50-60 minutes). If required, place weights on the panels along the joints to avoid irregularities in flatness.

TECHNICAL DATA (TYPICAL VALUES)		
Product details		
	COMPONENT A	COMPONENT B
Consistency:	thick paste	fluid liquid
Colour:	green/red	brown
Density (g/cm³):	1.65	1.2
Dry solids content (%):	100	100
Brookfield viscosity (mPa·s):	60,000 (# 7 - 50 RPM)	20 (# 1 - 50 RPM)
Storage:	Ultrabond Turf PU 2K remains stable. For at least 12 months if stored in its original, sealed container	
EMICODE:	EC1 R - very low emission	

Application data (at +23°C and 50% R.H.)	
Mixing ratio:	component A : component B = 90 : 10
Brookfield viscosity of mix (mPa·s):	25,000 (rotor 7 - 50 RPM)
Density of the mix (kg/m³):	1,600
Pot life of the mix:	approx. 60 minutes (rapid version: 30 minutes)
Permissible application temperature range:	from 0°C to +30°C
Open time:	70-80 minutes (rapid version: 40-45 minutes)
Start setting time:	after approximately 3 hours (rapid version: approx 2 hours)
End of setting time:	after approximately 4 hours
Set to light foot traffic:	after 12-24 hours
Waiting time before putting into service:	7 days

Final performances	
Tensile bonding between Ultrabond Turf Tape 100 and synthetic grass (N) (EN 12228):	> 1,500 N

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3.3 ULTRABOND TURF PU 1K

Single component, polyurethane adhesive for bonding synthetic grass surfaces

ULTRABOND TURF PU 1K is a single component, hygro-setting polyurethane resin-based adhesive, developed for bonding jointing tape between panels of synthetic grass (such as ULTRABOND TURF TAPE 100) both indoors and outdoors.

TECHNICAL CHARACTERISTICS

- Single component, ready-to-use
- May be used again for further applications
- Excellent rib stability, even at high temperatures
- Easy to apply, even at low temperatures (down to 0°C)
- Does not contain solvents or other substances which give off unpleasant smells
- Particularly recommended for those subjects who are allergic to epoxy or epoxy-polyurethane products
- Certified by GEV Institut as EMICODE EC1 R (very low emission of volatile organic compounds)

APPLICATION PROCEDURE

Before laying, make sure that the substrate has been prepared according to current norms and standards, and according to the final use of the pitch.

SPREADING THE ADHESIVE

Apply ULTRABOND TURF PU 1K on the ULTRABOND TURF TAPE 100 jointing tape. Spread the adhesive in order to completely butter the back of the synthetic grass panels.



ULTRABOND TURF PU 1K



LAYING THE PANELS

Follow the indications given by the manufacturer of the synthetic grass panels when laying the product. The panels must be applied on ULTRABOND TURF TAPE 100 while the adhesive is still fresh (within 90 minutes at normal temperatures). If required, place weights on the panels along the joints to avoid irregularities in flatness.

TECHNICAL DATA (TYPICAL VALUES)	
Product details	
Consistency:	creamy paste
Colour:	green
Density (g/cm³):	1,35
Dry solids content (%):	100
Brookfield viscosity (mPa-s):	45,000 ± 5,000 (23°C, No. 7 # at 50 RPM)
Storage:	Ultrabond Turf PU 1K remains stable for at least 12 months if stored in its original, sealed container
EMICODE:	EC1 R - very low emission
Application data (at +23°C and 50% R.H.)	
Application temperature range allowed:	from 0°C to +35°C
Open time (formation of surface skin):	80-100 minutes
Set to light foot traffic:	after approximately 12 hours
Waiting time before putting into service:	7 days
Final performances	
Elongation at breakage (DIN 53504) (%) (7 days at +23°C + 14 days at 50°C):	60
Allungamento a rottura (DIN 53504) (%) (7 gg +23°C + 14 gg 50°C):	280
Ultrabond Turf Tape 100-synthetic grass bond [(shear test according to EN 12228 (FIFA standards))]: (N)	1,850 (after 4 days at 23°C) 2,200 (after 4 days at 23°C + 14 days at 70°C in H ₂ O)
In service temperature range:	from -30°C to +80°C

N.B.: The indications in this pamphlet are for general use only. For applications under special conditions, please refer to the technical data sheet for each specific product, available at www.mapei.com, or contact the MAPEI Technical Assistance Department.



**“DANIEL BONARA”
FRANCIACORTA RACING
CIRCUIT
Castrezzato (Brescia), Italy**

Synthetic grass beyond the
circuit apex installed with
ULTRABOND TURF PU 1K



**STADIUM OF TERAMO
Italy**

Synthetic grass in the new two
star Fifa certified stadium
in Teramo, installed with
ULTRABOND TURF PU 2K



**RUGBY FIELD
“UNIONE RUGBY CAPITOLINA”
Rome, Italy**

Synthetic grass installed with
ULTRABOND TURF PU 2K