# ENGINEERED BOUND SUB-BASES FOR ARTIFICIAL AND HYBRID TURF

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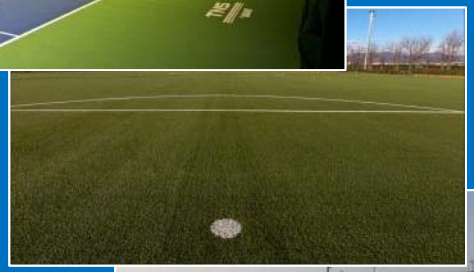
Corporate Product Manager – Sport Line – Mapei SpA

# MAPEI ALL PRODUCT LINES AND OUR SPORTS SYSTEM TECHNOLOGY

- PRODUCTS FOR CERAMICS AND STONE MATERIALS
- PRODUCTS FOR RESILIENT AND TEXTILE MATERIALS
- PRODUCTS FOR WOODEN FLOORING
- PRODUCTS FOR CEMENTITIOUS AND RESIN FLOORING
- PRODUCTS FOR ACOUSTIC INSULATION
- PRODUCTS FOR BUILDING
- ADMIXTURES FOR CONCRETE
- PRODUCTS FOR STRUCTURAL STRENGTHENING
- PRODUCTS FOR THE REPAIR OF MASONRY
- PRODUCTS FOR THERMAL INSULATION
- WALL PROTECTIVE AND DECORATIVE COATINGS
- PRODUCTS FOR WATERPROOFING
- PRODUCTS FOR UNDERGROUND CONSTRUCTIONS
- ELASTIC SEALANTS AND ADHESIVES
- GRINDING AIDS FOR CEMENT

*MAPECOAT TNS SYSTEM*



*ULTRABOND TURF SYSTEM*

*MAPESOIL SYSTEM*

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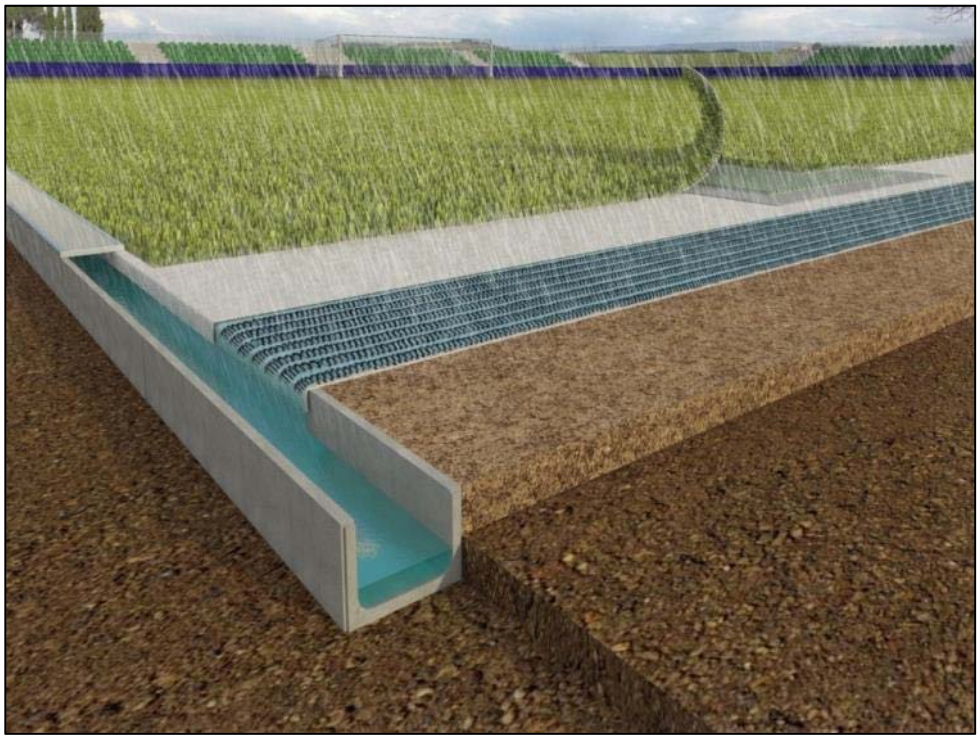
SPORTS SYSTEM TECHNOLOGY

## THE PITCH SUB-BASE – Horizontal drainage system



The SUB-BASE is the key element of the functionality of the entire system and its requirements are:

- ✓ **Mechnical**: load bearing capacity
- ✓ **Geometric**: slope and planarity
- ✓ **Stability and durability** over the time

**SOIL STABILIZATION**

# SOIL STABILIZATION PROCESS

## Chemical stabilization

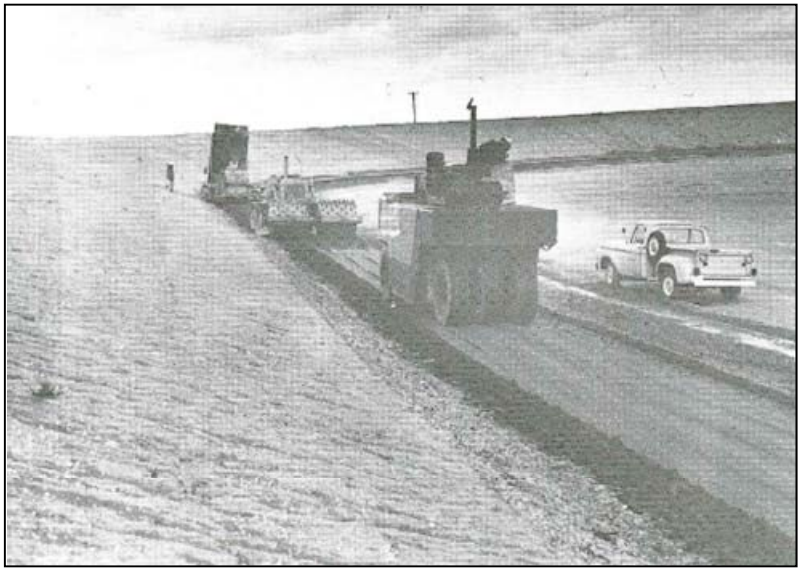
according to CNR UNI 10006

It refers to a soil whose properties are partially or completely changed by adding a dissimilar material before compacting the soil or by injecting an additive into the soil in place.

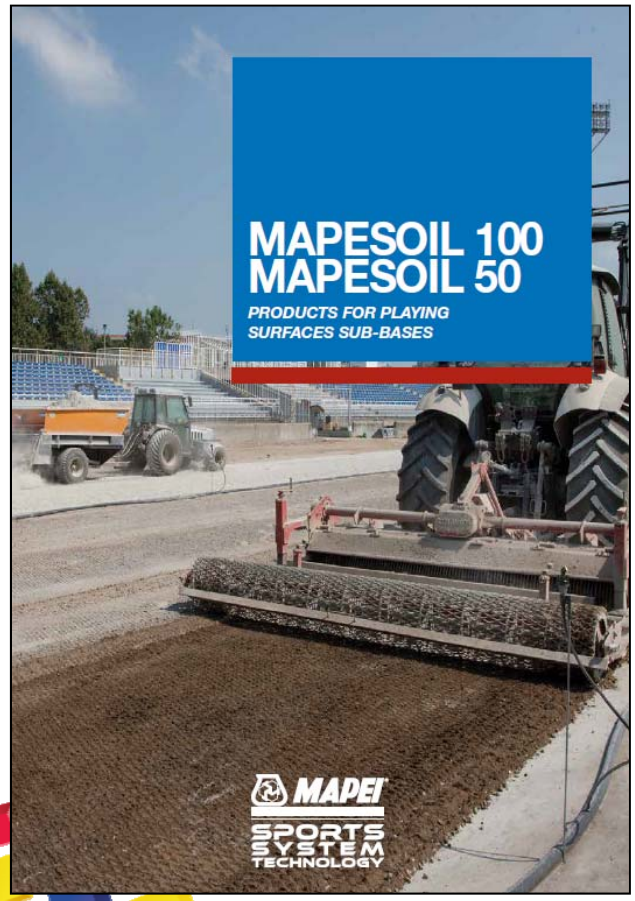
## Granulometric stabilization

according to CNR UNI 10006

It refers to the soil whose properties are emproved by adding small portion of missing aggregates in order to optimize the sieve analysis distribution.



# NEW SOIL STABILIZER – MAPESOIL PECULIARITIES




1. Chemical features of the product
2. Application equipment
3. Design and Federation Certifications

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# NEW SOIL STABILIZER – MAPESOIL PECULIARITIES

## 1. Chemical features of the product

- ✓ Powder form
- ✓ Hydraulic reaction binder
- ✓ Fiber-reinforced (PP, 1/d ratio>600)
- ✓ Pozzolanic reaction compounds
- ✓ Higher Blaine fineness

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# APPLICATION EQUIPMENT - TOPSOILING








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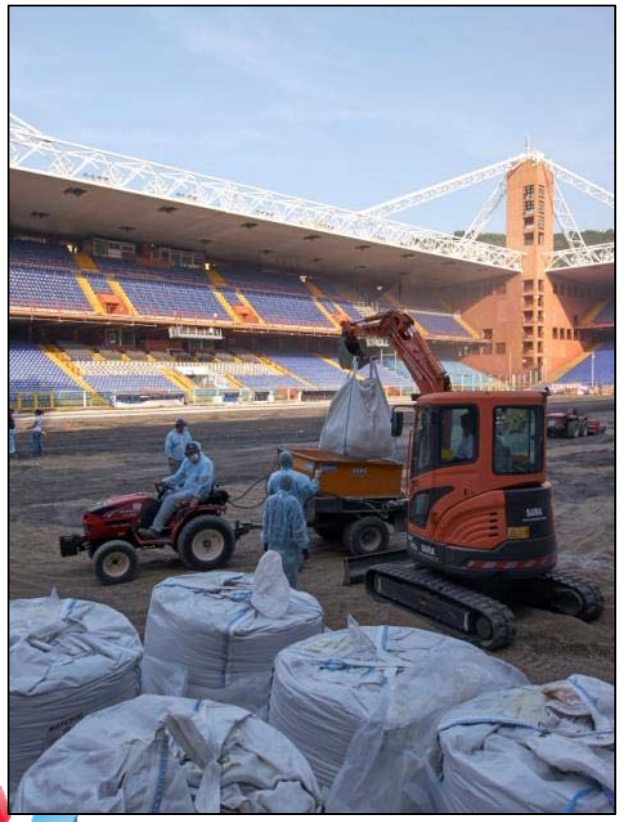
# APPLICATION – MAPESOIL PACKAGING

**MAPESOIL 100**
**MAPESOIL 50**

Fiber reinforced powder soil stabilizer for sport surfaces sub-bases

# APPLICATION – MAPESOIL PACKAGING



# APPLICATION – MAPESOIL PACKAGING

# APPLICATION – MAPESOIL SPREADING


# APPLICATION – MAPESOIL UNIFORM DOSAGE

# APPLICATION – MAPESOIL MIXING

# APPLICATION – MAPESOIL MIXING

Stone burier mechanism

# APPLICATION – WATERING

# APPLICATION – GRADING AND LEVELLING

# APPLICATION – ROLLING

# MAPESOIL 100/50 - LABORATORY TESTING

Soil sampling for each project

# MAPESOIL 100/50 – LABORATORY TESTING

1. **Soil classification**
   (according to CNR UNI 10006 – HRB AASHTO)
2. **Compaction curve by Proctor method**
   (according toEN 13286-2)
3. **CBR index**
   (EN 13286-47)

- **COMPATIBILITY**
- **MIXING WATER**
- **STABILIZER DOSAGE**

# MAPESOIL 100/50 – LABORATORY TESTING

1. **Soil classification**
   (according to UNI 11531 – HRB AASHTO)

*Table 4.1* Classification of Highway Subgrade Materials

| General classification | Granular materials (35% or less of total sample passing No. 200) | | | | | | |
|---|---|---|---|---|---|---|---|
| | *A-1* | | | *A-2* | | | |
| Group classification | A-1-a | A-1-b | A-3 | A-2-4 | A-2-5 | A-2-6 | A-2-7 |
| Sieve analysis (percentage passing) | | | | | | | |
| No. 10 | 50 max. | | | | | | |
| No. 40 | 30 max. | 50 max. | 51 min. | | | | |
| No. 200 | 15 max. | 25 max. | 10 max. | 35 max. | 35 max. | 35 max. | 35 max. |
| Characteristics of fraction passing No. 40 | | | | | | | |
| Liquid limit | | | | 40 max. | 41 min. | 40 max. | 41 min. |
| Plasticity index | 6 max. | | NP | 10 max. | 10 max. | 11 min. | 11 min. |
| Usual types of significant constituent materials | Stone fragments, gravel, and sand | | Fine sand | Silty or clayey gravel and sand | | | |
| General subgrade rating | Excellent to good | | | | | | |

| General classification | Silt-clay materials (more than 35% of total sample passing No. 200) | | | |
|---|---|---|---|---|
| Group classification | A-4 | A-5 | A-7 A-7-5[a] A-6 | A-7-6[b] |
| Sieve analysis (percentage passing) | | | | |
| No. 10 | | | | |
| No. 40 | | | | |
| No. 200 | 36 min. | 36 min. | 36 min. | 36 min. |
| Characteristics of fraction passing No. 40 | | | | |
| Liquid limit | 40 max. | 41 min. | 40 max. | 41 min. |
| Plasticity index | 10 max. | 10 max. | 11 min. | 11 min. |
| Usual types of significant constituent materials | Silty soils | | Clayey soils | |
| General subgrade rating | Fair to poor | | | |

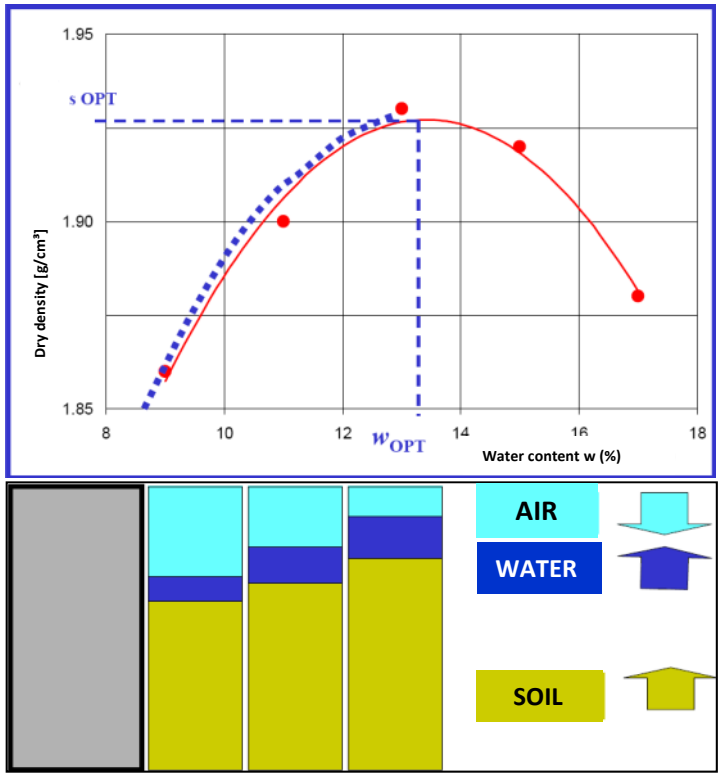
[a] For A-7-5, $PI \leq LL - 30$
[b] For A-7-6, $PI > LL - 30$

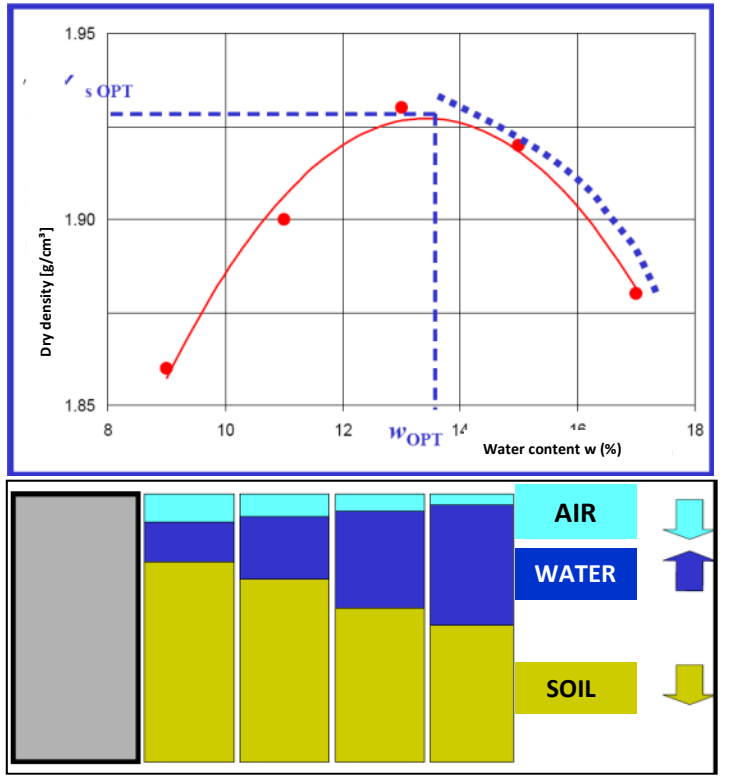
# MAPESOIL 100/50 – LABORATORY TESTING

2. **Compaction curve by Proctor method**
   (according to EN 13286-2)

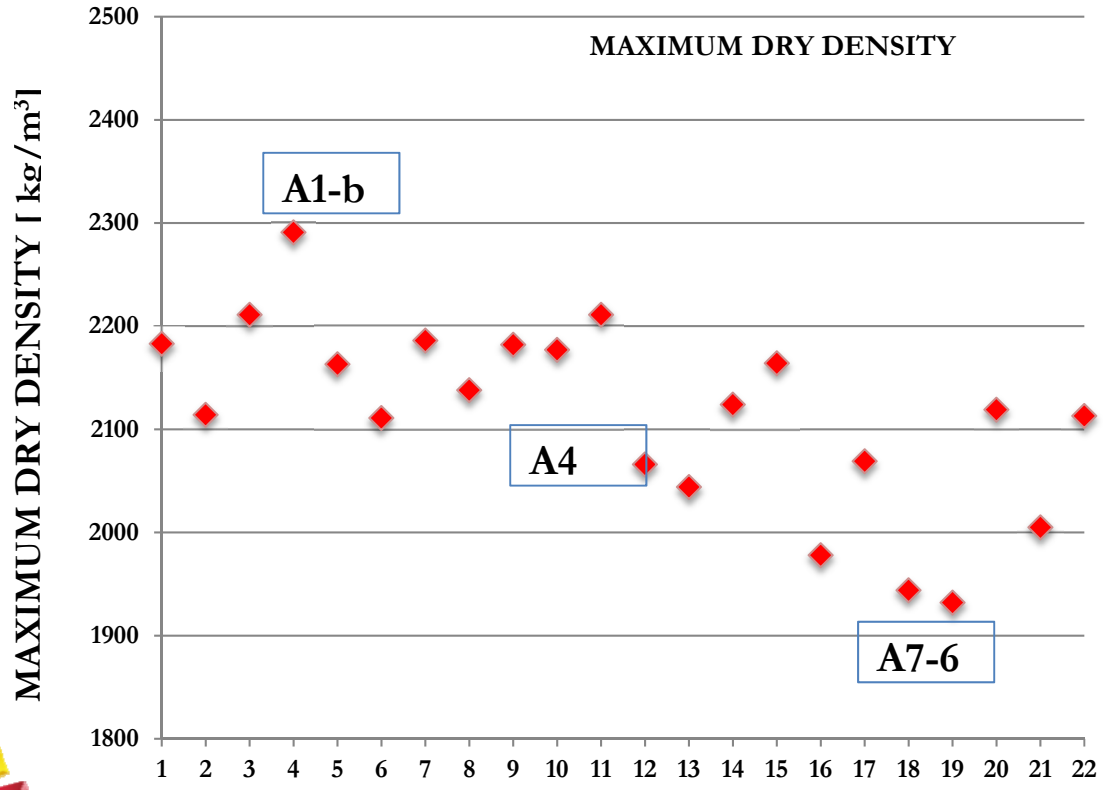
- Optimum Moisture Content (OMC)
  (Mixing water when applying)

# OPTIMUM MOISTURE CONTENT (OMC)



# MAXIMUM DRY DENSITY/SOIL TYPES




Thickness treatment: 10 cm
Dosage stabilizer

**A1-b**
2300 x 0,10 x 0,03 = **6,9 kg/m²**

**A4**
2000 x 0,10 x 0,03 = **6 kg/m²**

**A7-6**
1800 x 0,10 x 0,03 = **5,4 kg/m²**

## OPTIMUM MOISTURE CONTENT/SOIL TYPES

Thickness treatment: 10 cm
Mixing water

**A1-b**
OMC: 4 ÷ 6% = **9,2 ÷ 13,8 l/m²**

**A4**
OMC: 8 ÷ 10% = **16 ÷ 20 l/m²**

**A7-6**
OMC: 12 ÷ 26% = **21,6 ÷ 46,8 l/m²**

Overall mixing water quantity (7.000 $m^2$)

**A1-b**
64,4 ÷ 96,6 $m^3$

**A4**
112 ÷ 140 $m^3$

**A7-6**
151,2 ÷ 327,6 $m^3$

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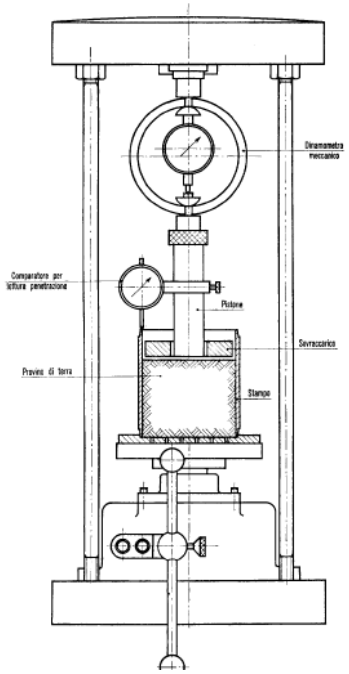
# MAPESOIL 100/50 – LABORATORY TESTING

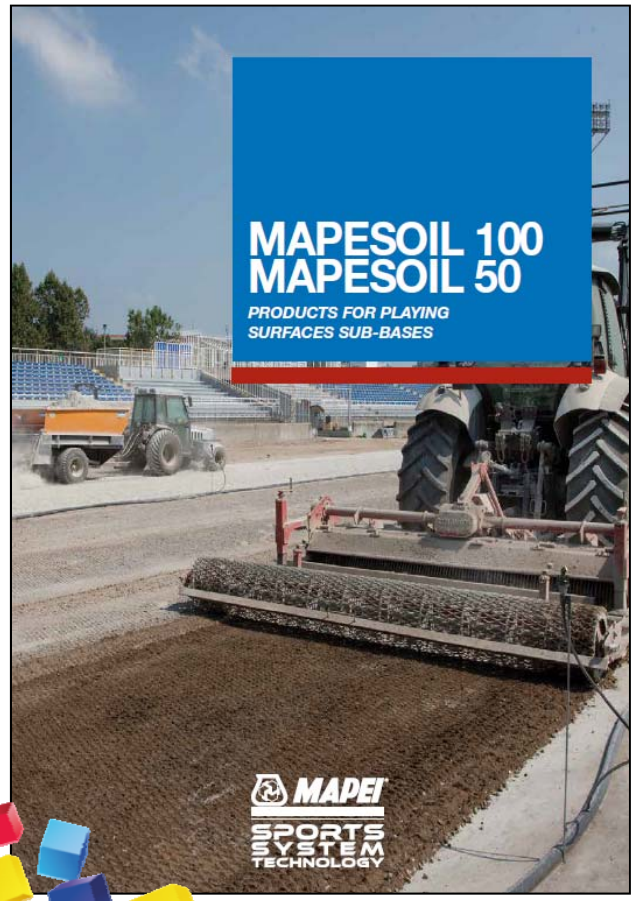
3. **CBR index (Californian Bearing Ratio)**
(EN 13286-47)




# MAPESOIL 100/50 – LABORATORY TESTING

3. **CBR index (Californian Bearing Ratio)**
(EN 13286-47)


# NEW SOIL STABILIZER – MAPESOIL PECULIARITIES




1. Chemical features of the product;
2. Application equipment;
3. **Design and Federation Requirements.**

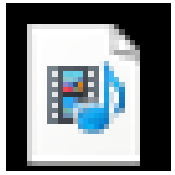
# BOUND BASE – final inspection for acceptance

## BOUND BASE – final inspection for acceptance

**Bearing capacity and Elastic modulus**

**$E_d$ > 500÷700 kg/cm²**
by using LPT Ø 300 mm

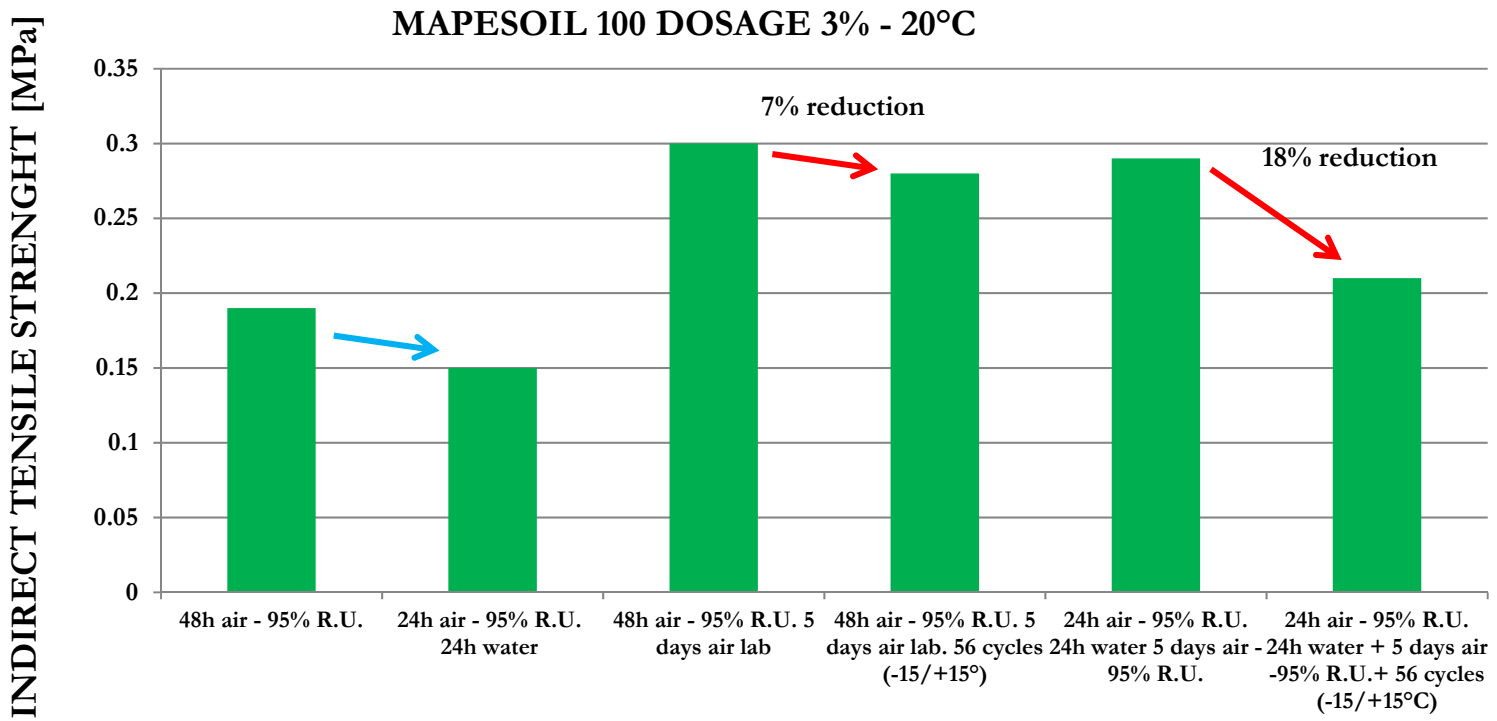
## BOUND BASE – final inspection for acceptance



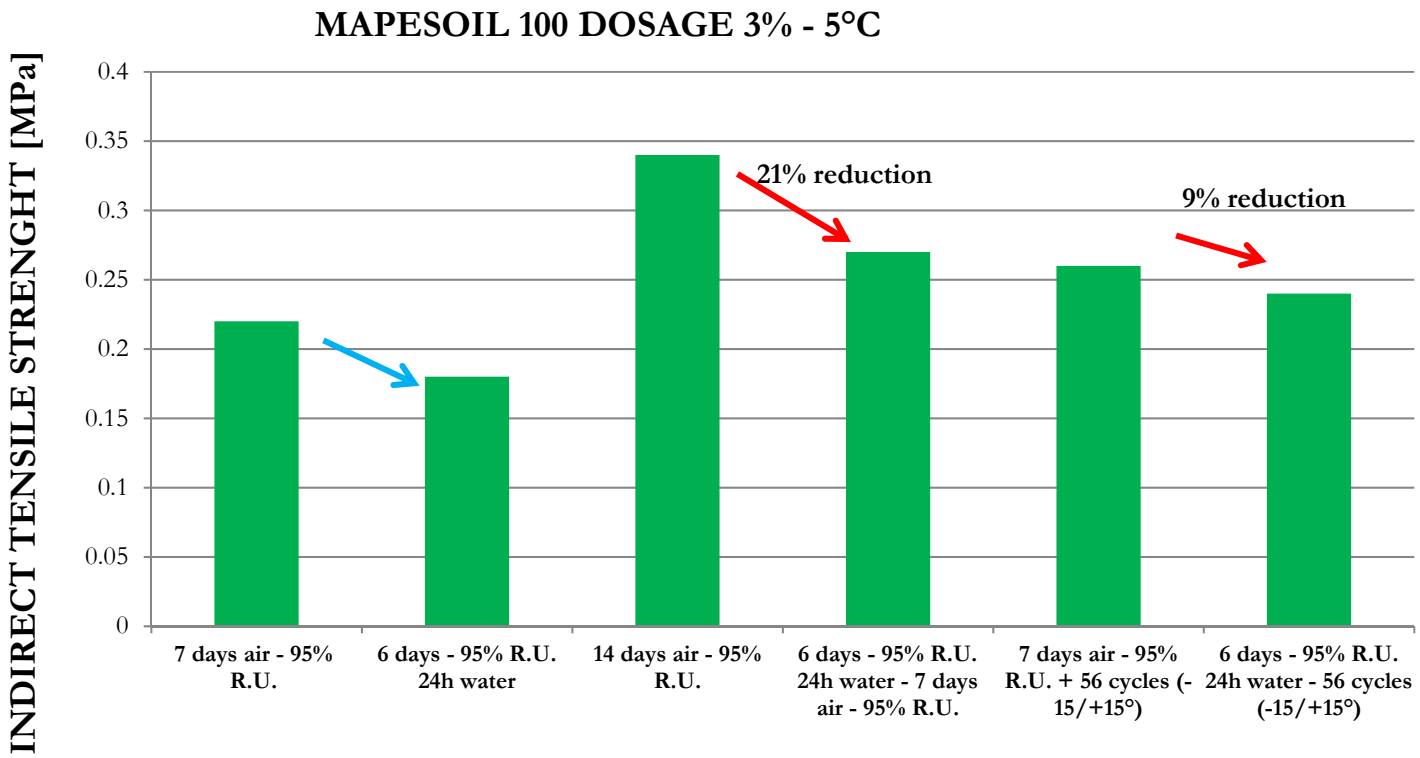
2. Juventus 2 IMG_1472.MOV

3. Juventus 3 IMG_1810.MOV

# APPLICATION AND SERVICE LIFE CONDITIONS/SOIL TYPES



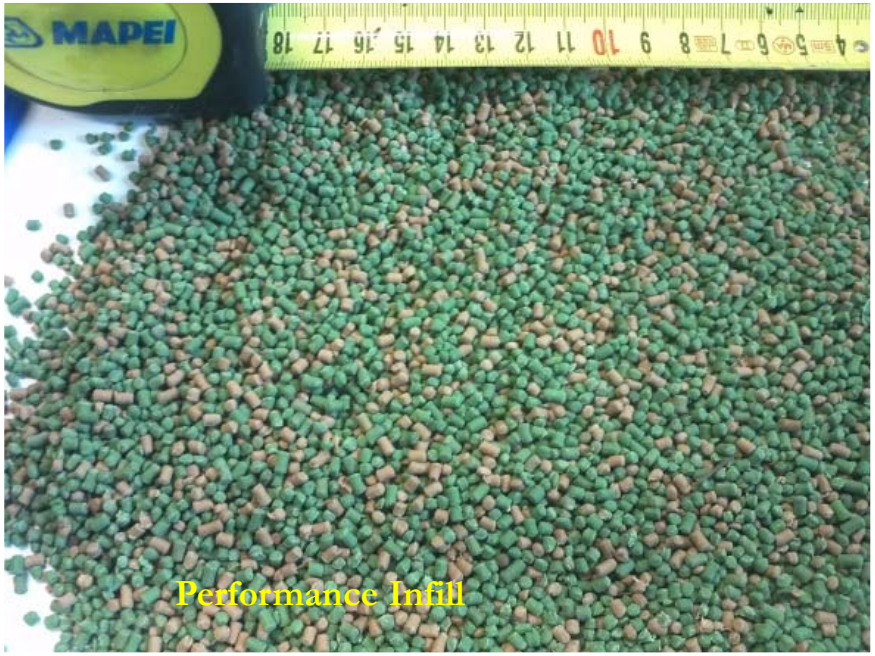
# APPLICATION AND SERVICE LIFE CONDITIONS/SOIL TYPES



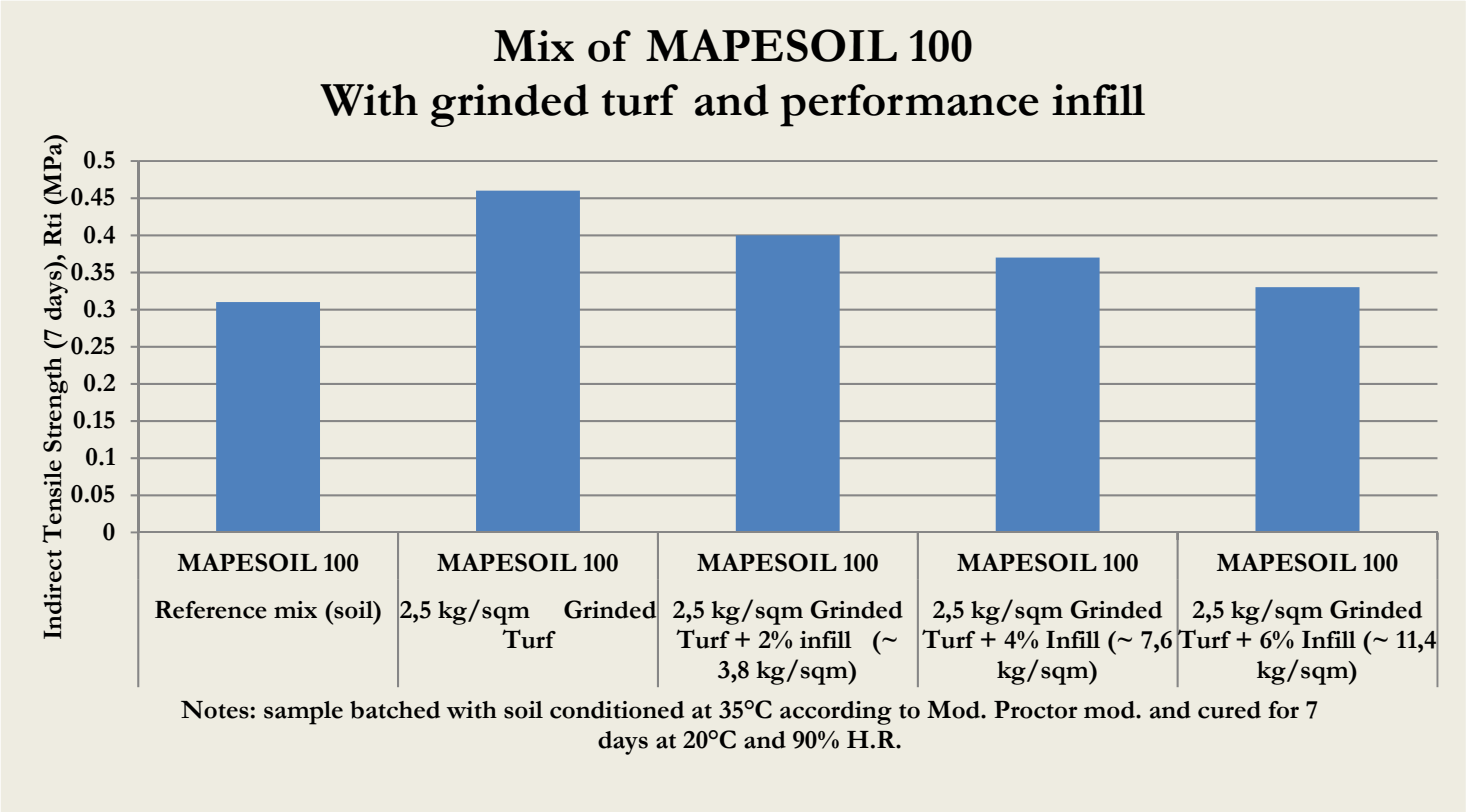
## MAPESOIL 100/50 PECULIARITIES: SOIL/AGGREGATES TYPES

- ✓ Existing rammed-earth pitches;
- ✓ Existing natural turf pitches;
- ✓ Recycled aggregate from C&D;
- ✓ Milled asphalt (RAP);
- ✓ Existing red clay tennis court.

# MAPESOIL RESEARCH PROJECTS – WORN OUT TURF

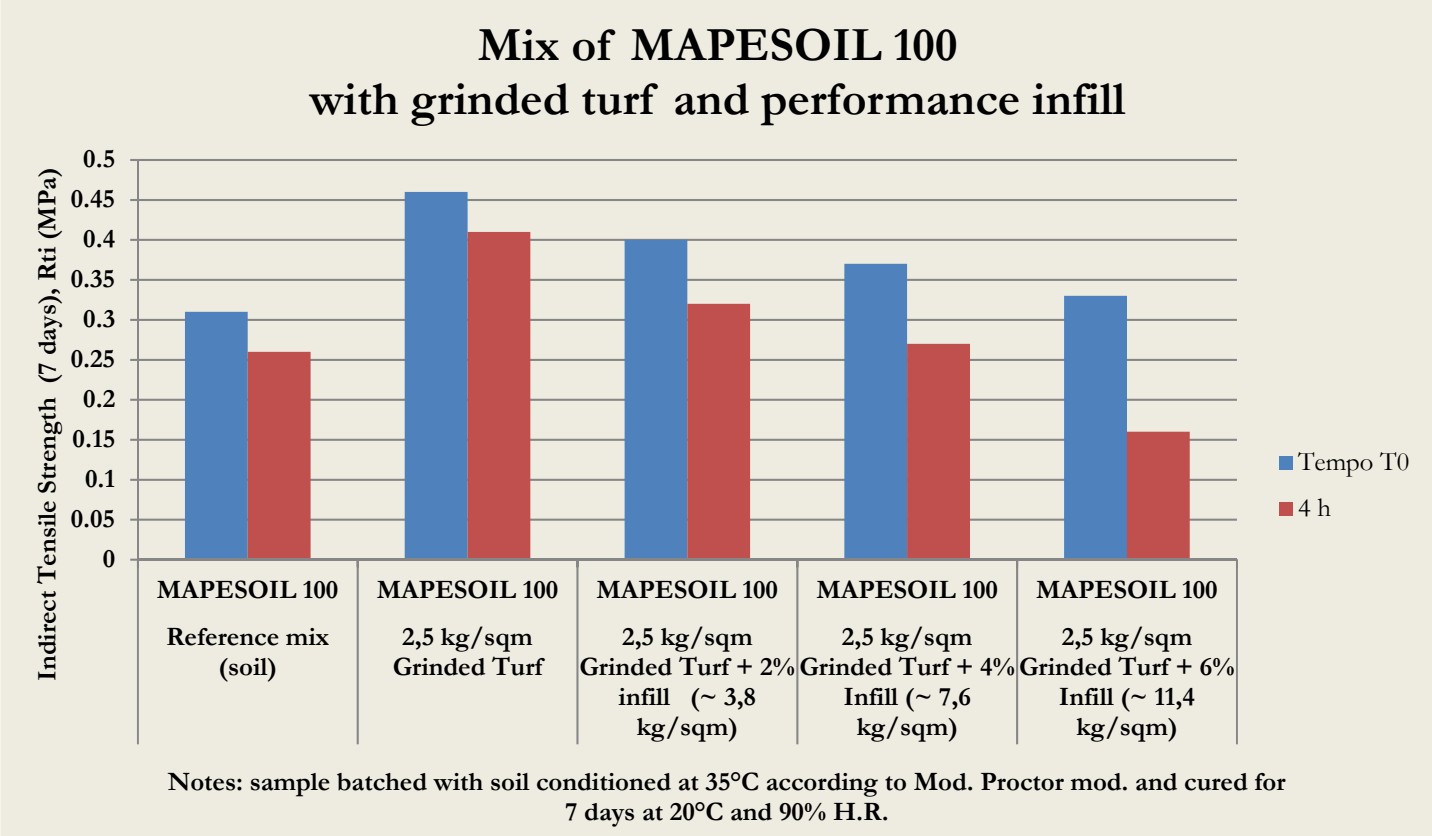



# MAPESOIL RESEARCH PROJECT – WORN OUT TURF




Notes: sample batched with soil conditioned at 35°C according to Mod. Proctor mod. and cured for 7 days at 20°C and 90% H.R.

# MAPESOIL RESEARCH PROJECT – WORN OUT TURF




Notes: sample batched with soil conditioned at 35°C according to Mod. Proctor mod. and cured for 7 days at 20°C and 90% H.R.

# MAPESOIL RESEARCH PROJECT – WORN OUT TURF

VIDEO SAN SIRO

# WE LOVE AND SPONSOR SASSUOLO CALCIO

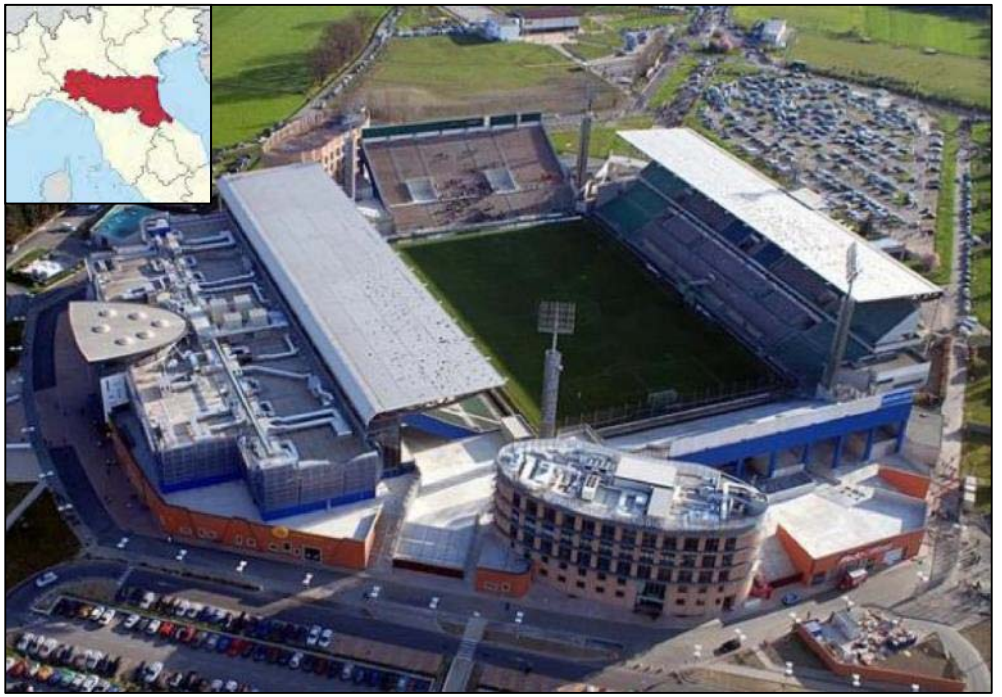

**2004 – 2005**
Mapei SpA becomes team owner:
starting from amateurs league (C2)


**Season 2012 – 2013**
Sassuolo reaches for SERIE A

## STADIUM – location and history

(old) name: Giglio Stadium
Construction: 25.9.94-15.4.95
Costs: ~25 ml €
Seats: 25.000

first Italian Owned stadium
first stadium with «naming rights»
foundrising: totally private



## SERIE A FOOTBALL LEAGUE REQUIREMENTS

1. Grass cover: planar, uniform, homogeneous, having proper density

2. Drainage: high performances providing reliability in wet conditions and reducing the impact of flooding

3. Aestetics: uniform color

drainage renovation is paramount

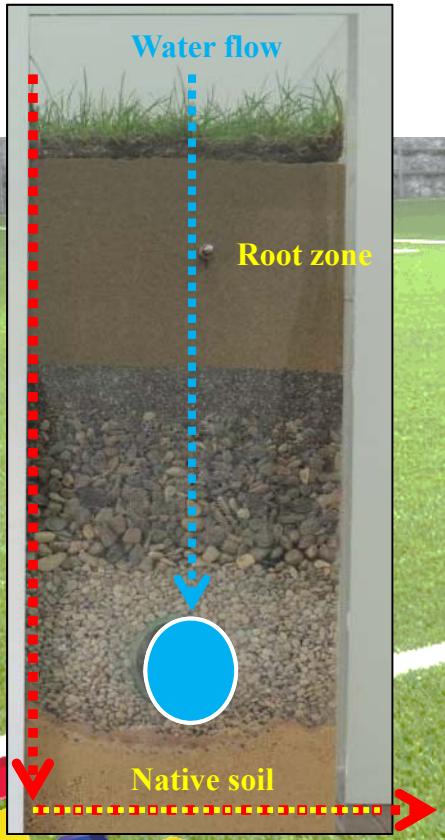

’13 - ’14
Serie A match
Sassuolo – Bologna

## THE PITCH STATE OF THE ART

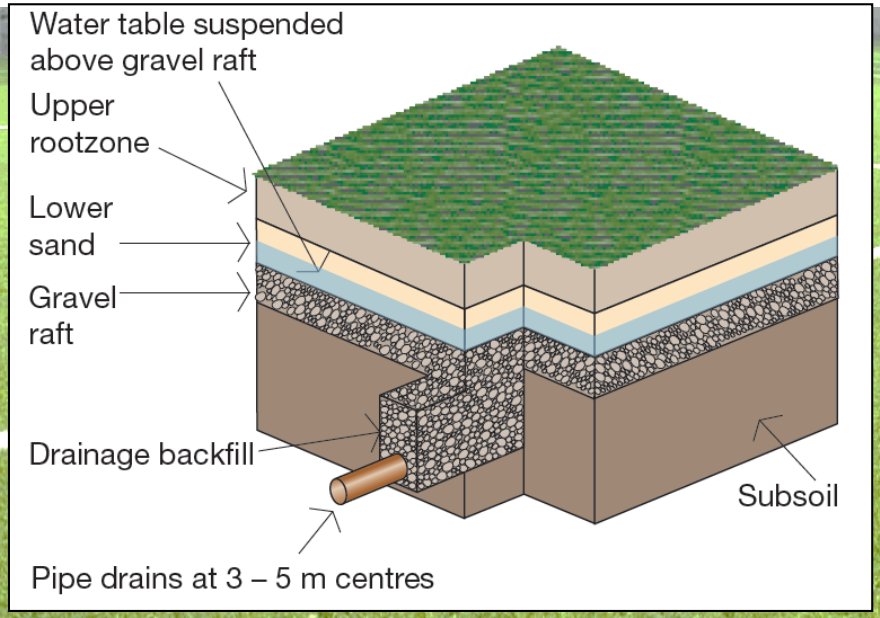
Both use of the pitch and seasonal maintenance costs are strongly affected by the *sub-base type* and *drainage efficiency*.

# TRADITIONAL METHOD FOR RENOVATION OF THE PITCH

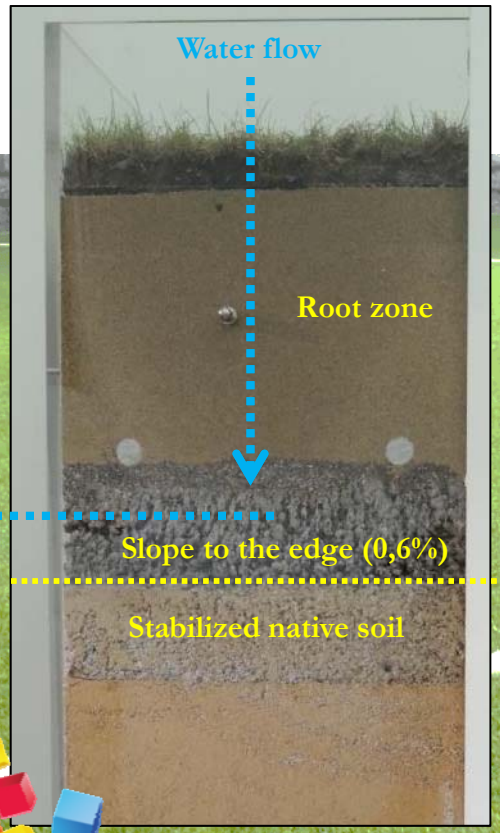
**Pipe drainage with water table suspended above gravel raft**
(by Sport England – *Natural Turf for Sport* – Guideline 2011)




40 ÷ 60 cm
3.800 – 5.800 $m^3$
of disposal for
an 11-a-side pitch
(8.000 $m^2$)



# INNOVATIVE SOLUTION: MAPESOIL TECHNOLOGY




20 cm

Silica sand 0,1-2 mm

3 cm

8 cm

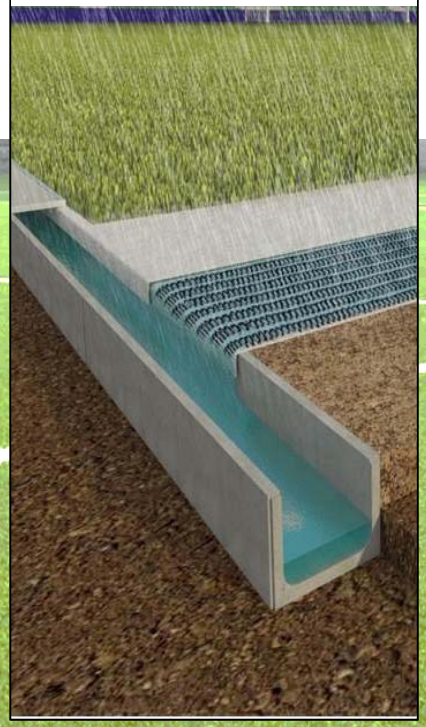
Blinding layer of coarse sand (1,5-3 mm)
**No-pipe drainage blanket, bounded by Mapesoil VD**

15 cm

Stabilized native soil, treated by **Mapesoil 50**

Native soil

**Artificial Turf Technology**



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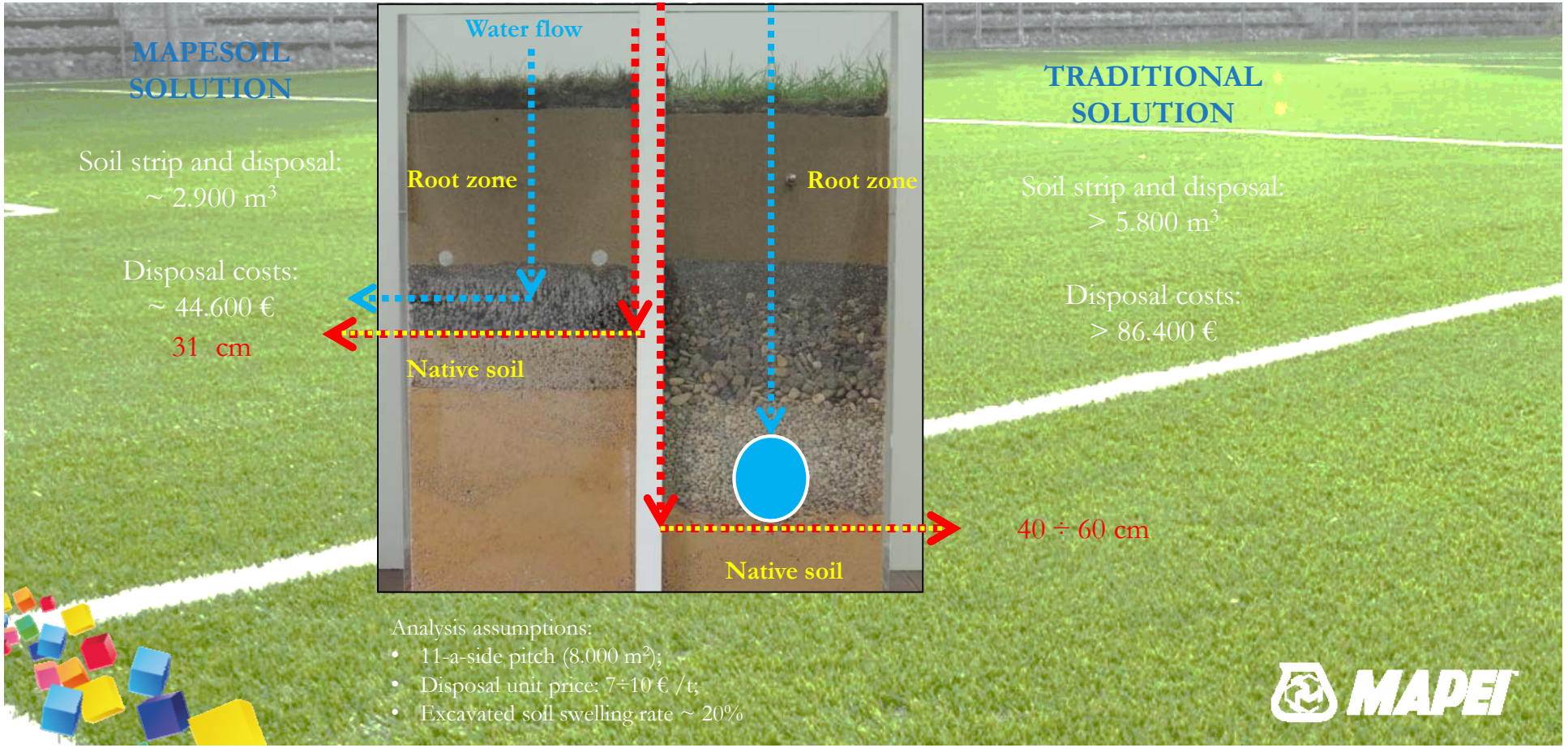
# NO-PIPE DRAINAGE INSTALLATION

# SOLUTIONS COMPARISON



# DRAINAGE PROPERTIES

LABOSPORT

RAPPORTO DI PROVA

13-0125IT

Emesso il 28 giugno 2013

CLIENTE
MAPEI SPA

DENOMINAZIONE PRODOTTO
MAPESOIL VD Miscela 2 (200Kg/m3)

CATEGORIA
MASSETTO

Test in accordo a:

MI-LND-021 Sottotappeti elastici - Determinazione della capacità idraulica nel piano e UNI EN 12616:2004 Suoli sportivi. Determinazione della permeabilità all'acqua

La riproduzione di questo rapporto di prova è autorizzata esclusivamente nella sua forma integrale

I risultati si intendono validi esclusivamente per il campione sottoposto a prova

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**MAPESOIL VD**

High performance hydraulic binder for draining sport sub-bases

**MIX CHARATERISTICS**

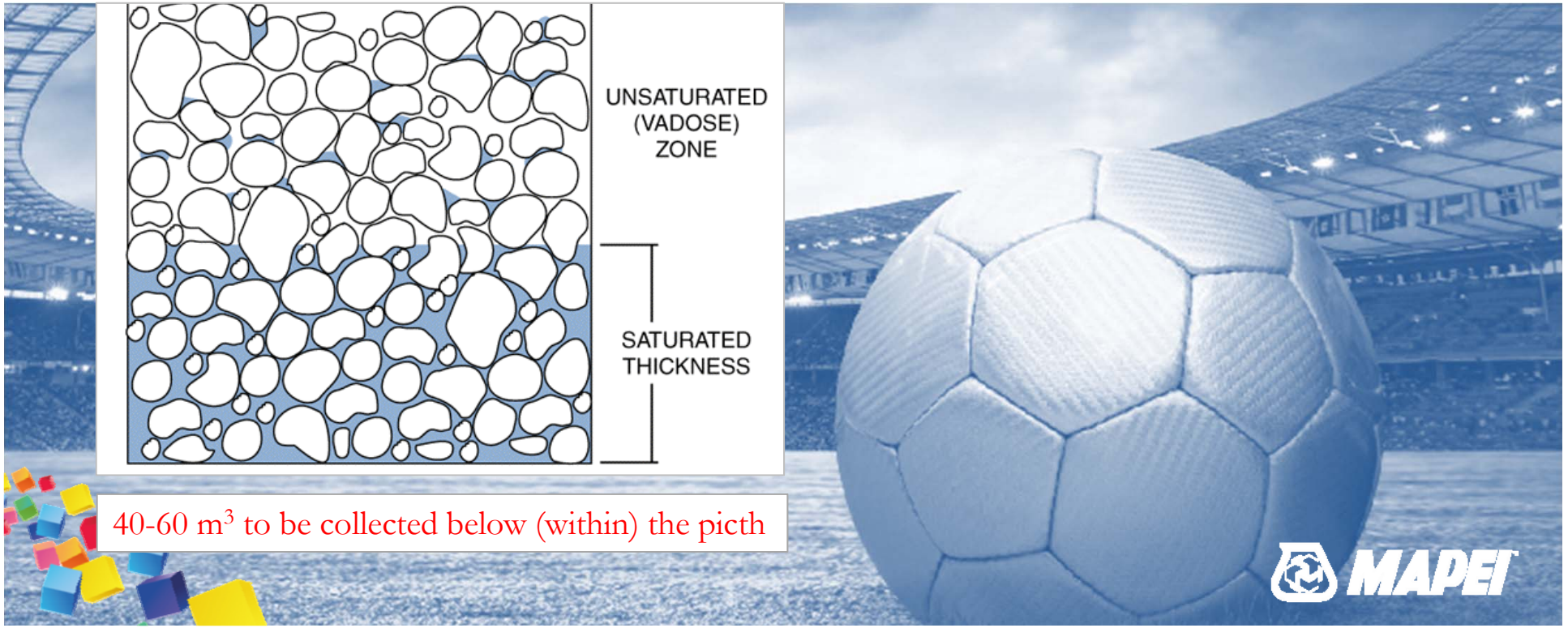
Thickness: (minimum)
8 cm
Hydraulic conductivity (l/m*s): 0,92
Permeability (mm/h)
according to EN 12616 (slope 0,6%): **> 360**

Permeability (mm/h)
according to USGA
recommendations: **> 150**

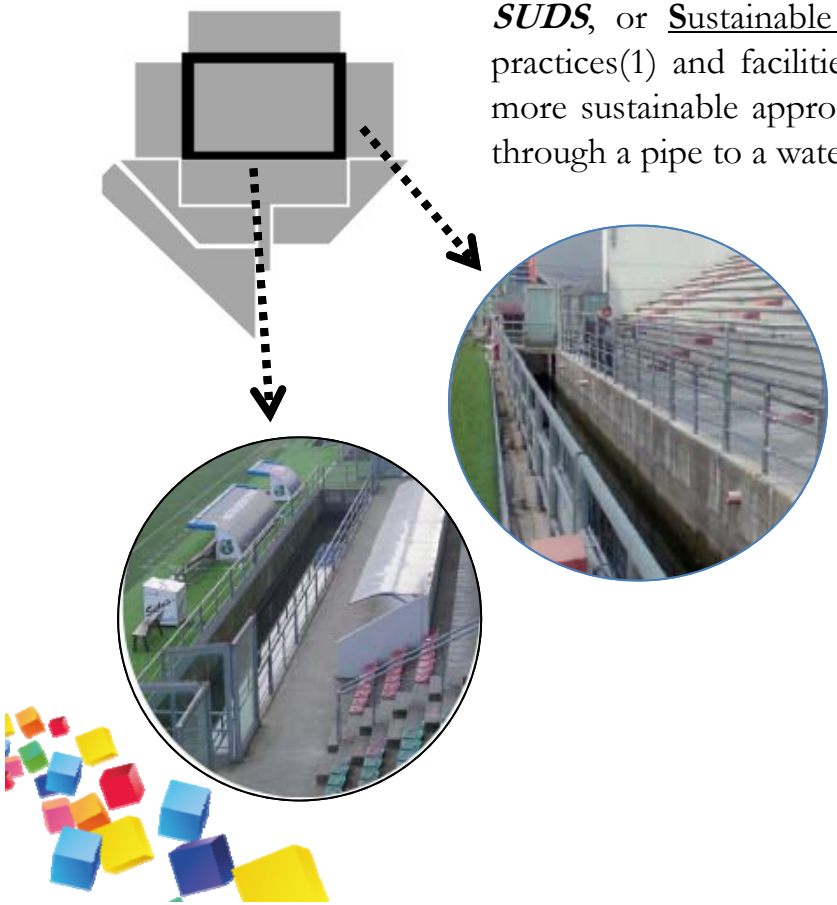
**LABOSPORT ITALIA SRL CERTIFICATION**

# DRAINAGE PERFORMANCES

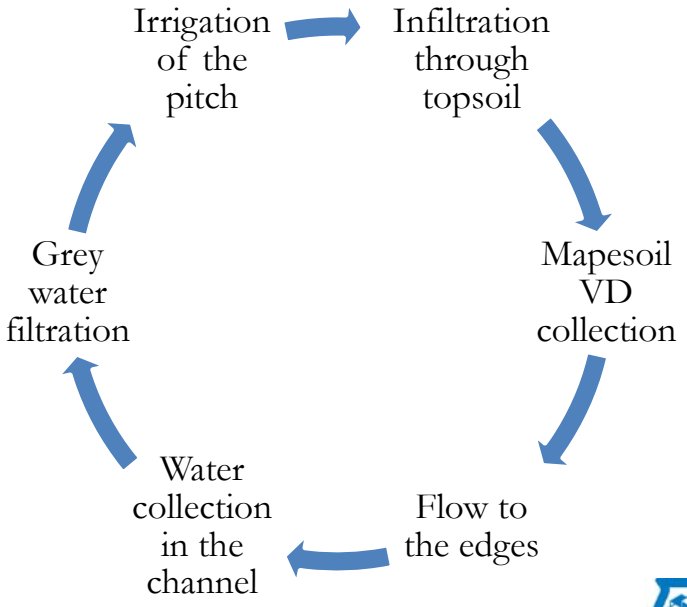
STORAGE CAPACITY
Each $m^2$ can store up to 80 liter of water



# MAPESOIL VD WATER RE-USE



***SUDS***, or Sustainable Urban* Drainage Systems are a sequence of water management practices(1) and facilities(2) designed to drain surface water in a manner that will provide a more sustainable approach than what has been the conventional practice of routing run-off through a pipe to a watercourse.



# NO PIPE DRAINAGE: KEY POINTS FOR THE PITCH MAINTENANCE

- ✓ Strong reduction of the soil stripping and removal;
- ✓ Significant cost reduction of the waste management plan;

- ✓ Higher infiltration rate of the surface when compared to the traditional pipe systems;
- ✓ Homogeneous water collection over the surface (like having pipes side by side);
- ✓ Constant humidity of the top soil and the rootzone;
- ✓ Even performance of the playing area;
- ✓ Re-use of water collected through **'Mapesoil VD'** if required;
- ✓ Reduction of heating system costs if present;
- ✓ Grass maintenance cost reduction, with less wear of the lawn.


THANK YOU
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