



# Sport Surface Standards

Perceptions, realities, aspirations & then there is testing



smarter  
synthetic  
solutions



*promoting the value of play*

**Martin Sheppard**

Managing Director



**smart connection**  
consultancy

# Agenda

- 1. Setting the Scene – What are standards?**
- 2. Standards and Expectations**
- 3. The SMART Standards Continuum & The Smart Sports Field Hierarchy**
- 4. The Importance of Testing and Certification**
- 5. Conclusion**
- 6. Questions and Discussion**



**QUALITY**

...is a *means*  
not an *end*

# 1. Setting the Scene

*What are standards?*

**Performance of...**

- ...surface / system (e.g. FIFA Quality/ WR Reg 22)
- ...system components (e.g. shockpad & prEN15330-4)
- ...pavement base (Geotech standards)
- ...the organisation (ISO 9000, 14000, FIH Certified Builder etc.)

**Construction methodology standards**

**Environmental standards (REACH, Heavy Metals, Sustainability )**

**Safety Standards ( EN 71.3 (2013) Safety of Toys – Part 3 Mitigation of Certain Elements able 2, Category III )**

**And...**



“Effective performance is  
process making

Its not just the end standards  
you measure!

Its each stage of the process

- Brian Tracy



# 2. Standards and Expectations

## *Understanding Outcomes, Aspirations and Reality*

- **Sport and Government want the “best” standards possible for their ‘new field’**
- **Assume that the International Federation standards are the pinnacle of the standards...or the ‘highest lowest common denominator possible’**
- **Confusion between stadia/professional and community ... with two tier standards**
- **Some are not focused on the whole ‘package’ – pavement, sub-base, drainage, construction, equipment, maintenance etc**
- **Smart Whole of Life sustainability standards**
- **What is ‘Fit for Purpose’**



## 2. Standards and Expectations

Sport	Elite/Stadium Level	Community Level
<b>Athletics</b>	IAAF 1	IAAF 2
<b>Hockey</b>	Global and Global Elite	National, GEN2 & Multi-sport
<b>Football (Soccer)</b>	Quality Pro	Quality & Basic
<b>Rugby Union</b>	Regulation 22	Regulation 22
<b>Rugby League</b>	Stadia	Community
<b>Gridiron</b>	None	None
<b>Tennis</b>	ITF 2	ITF 1
<b>AFL/Cricket Aust</b>	N/A	Community

**Standards are SO much more than the certification process of the International Federation**



**Start at the END and work backwards... defining the expectations and standards – field of play, construction and landscaping**

# 2. Standards and Expectations

## *Scope of Standards*

### FIELD of PLAY

#### Player with surface

- Traction
- Energy restitution
- Heat
- Abrasion

#### Ball with surface

- Ball roll
- Ball bounce

#### Safety of surface

- Drainage
- Material
- Shock absorption
- Infill splash

#### Surface performance

- Durability
- UV stability
- Tolerances
- Permeable

#### Sport specific overlays

### CONSTRUCTION

#### Drainage

- ARI
- Storm water capacity
- Drainage strategy

#### Pavement Base

- Geotech engineer
- Environmental
- Load bearing
- Water levels

#### Construction Standards

- Pavement
- Surface grades
- Concrete
- Tolerances

#### Statutory Standards

- Roads (RMS & VicRoads)
- Council Local Laws

### SMART & HOLISTIC

#### Environmental

- Microplastics
- Heat
- Green engineered
- Porosity

#### Health

- PAH's, Heavy metals,
- Infill ingestion

#### Warranty's

- Linked to usage (60 hr pw)
- Workmanship
- Cost of replacement
- Loss of income etc.

### SUSTAINABILITY

#### UN's Sustainability Development Goals

- 17 SDG's

#### Whole of Life Cycle

- Planning
- Design
- Product Procurement
- Construction Stage
- Management, Maintain & Renovate Stage
- Recovery Stage

The background image shows a lush green field in the foreground. In the middle ground, there is a green metal fence with a gate on the left and a brick building on the right. The sky is filled with heavy, grey clouds, suggesting an overcast day. The overall scene is outdoors and appears to be a rural or sports facility setting.

**Standards Must Be  
FIT for PURPOSE**

# 3. The SMART Standards Continuum

*Where to Start?*

## Performance Surface Standards



## Engineered Solution Standards



# 3. The SMART Standards Continuum

*Where to Start?*

## Performance Surface Standards

- **Basic Functionality**  
(looks over performance)
- **Introductory Level**  
(play, rec. & non-certified)
- **Certified Sports fields**  
(single and multi-sport)
- **Certified, Smart & Sustainable Performance**

## Engineered Solution Standards



# 3. The SMART Standards Continuum

*Where to Start?*

## Performance Surface Standards

- **Basic Functionality**  
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(play, rec. & non-certified)
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(single and multi-sport)
  - **Certified, Smart & Sustainable Performance**

## Engineered Solution Standards

- **Landscaped Base**
- **Entry Base Level**  
(Simple Drainage)
- **Engineered Base**  
(Drainage solution FFP)
- **Smart, Green engineered**  
(ESD Drainage Solution)

# 3. The SMART Standards Continuum

## The SMART Matrix

The Smart Hierachy of Sports Surfaces

The Smart Hierachy of Sports Surfaces									
PERFORMANCE SURFACE STANDARDS	8. Certified, SMART & Sustainable Performance Fields	Single/Multi HD Fields							
	7. Professional / Stadia Fields (Cert.)	Single/Multi HD Fields							
		Multi-sports Fields							
		Single							
	6. Sports Fields (Cert.)	Single/Multi HD Fields							
		Multi-sports Fields							
		Single							
	5. Community Recreation Fields	Multi-sports Fields							
		Recreation / Mini-fields							
	4. School Playing Fields	Sports Basic Level (Secondary)							
Games Basic Level (primary)									
3. Multi-use Games Areas / Courts	Highly Durable (HD)								
	Functional								
2. Playgrounds	Impact standards								
	Functional Covering								
1. Landscape	High Use/ Highly Durable (HD)								
	Functional								
		1. SAND / Compacted Soil (No drainage)	2. Compacted Gravel Base/ Top of Surface (e.g. Asphalt) (no drainage)	3. Entry Level Pavement (5-10 years) & Basic Drainage	4. Engineered Basic Pavement (10 years)& Drainage (1-5 ARI)	5. Geotech Guided Pavement (10 - 20 years) & Drainage (5-10 ARI)	6. Geotech Guided Pavement (20 years) & Drainage (10-20 ARI)	7. Geotech Guided Pavement (20-50 years) & Drainage (20-50 ARI)	8. Geotech Guided SMART, Sustainable Green Engineered Base (50+ years) & Drainage (50-100ARI)
ENGINEERED PERFORMANCE STANDARDS									

# The Smart Hierarchy of Sports Surfaces

PERFORMANCE SURFACE STANDARDS



2. Playgrounds

Impact standards

Functional Covering

1. Landscape

High Use/ Highly Durable (HD)

Functional

ENGINEERED PERFORMANCE STANDARDS





# The Smart Hierarchy of Sports Surfaces

PERFORMANCE SURFACE STANDARDS

8. Certified, SMART & Sustainable Performance Fields	Single/Multi HD Fields
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	Functional
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	Functional Covering
1. Landscape	High Use/ Highly Durable (HD)
	Functional

**Best Practice –  
(Certified, SMART & Sustainable)**

ENGINEERED PERFORMANCE STANDARDS

# The Smart Hierarchy of Sports Surfaces

PERFORMANCE SURFACE STANDARDS



1. SAND /  
Compacted Soil  
(No drainage)

2. Compacted Gravel  
Base/ Top of Surface  
(e.g. Asphalt) (no  
drainage)

ENGINEERED PERFORMANCE STANDARDS

# The Smart Hierarchy of Sports Surfaces

PERFORMANCE SURFACE STANDARDS

**Entry Base Level  
Pavement**  
(Simple drainage  
solution)

1. SAND /  
Compacted Soil  
(No drainage)

2. Compacted Gravel  
Base/ Top of Surface  
(e.g. Asphalt) (no  
drainage)

3. Entry Level  
Pavement (5-10  
years) & Basic  
Drainage

4. Engineered  
Basic Pavement  
(10 years)&  
Drainage (1-5 ARI)

**ENGINEERED PERFORMANCE STANDARDS**

# The Smart Hierarchy of Sports Surfaces

PERFORMANCE SURFACE STANDARDS



1. SAND /  
Compacted Soil  
(No drainage)

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(e.g. Asphalt) (no  
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3. Entry Level  
Pavement (5-10  
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Drainage

4. Engineered  
Basic Pavement  
(10 years)&  
Drainage (1-5 ARI)

5. Geotech Guided  
Pavement (10 - 20  
years) & Drainage  
(5-10 ARI)

6. Geotech Guided  
Pavement (20  
years) & Drainage  
(10-20 ARI)

7. Geotech Guided  
Pavement (20-50  
years) & Drainage  
(20-50 ARI)

**ENGINEERED PERFORMANCE STANDARDS**

# The Smart Hierarchy of Sports Surfaces

PERFORMANCE SURFACE STANDARDS

**Best Practice – (Certified,  
SMART & Sustainable)**

1. SAND /  
Compacted Soil (No  
drainage)

2. Compacted Gravel Base/  
Top of Surface (e.g. Asphalt)  
(no drainage)

3. Entry Level  
Pavement (5-10  
years) & Basic  
Drainage

4. Engineered Basic  
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Pavement (10 - 20  
years) & Drainage (5-10  
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6. Geotech Guided  
Pavement (20 years) &  
Drainage (10-20 ARI)

7. Geotech Guided  
Pavement (20-50 years)  
& Drainage (20-50 ARI)

8. Geotech Guided SMART,  
Sustainable Green Engineered  
Base (50+ years) & Drainage (50-  
100ARI)

**ENGINEERED PERFORMANCE STANDARDS**



# 3. The SMART Standards Continuum

## Smart Standards Continuum

1. Planning

2. Design

3. Procurement

4. Construction

5. Maintenance and  
Renovation

6. Replacement

**SMART** = **S**pecific – **M**easurable – **A**chievable – **R**ealistic – **T**imely

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# 3. The SMART Standards Continuum

## Smart Standards Continuum

1. Planning				2. Design						3. Procurement					4. Construction					5. Maintenance and Renovation					6. Replacement		
Environmental Sustainability	Community Standards /Usage	Economic & Social Value Rol	Fit For Purpose	Field of Play Design	Construction Strategy	Smart Strategy	Sustainability	Region Specific Enhancements	Sports Overlay Requirements	Organisational Standards (CoC, RFT, Environmental legislation)	Procurement Strategy (D&C, DF&C, DD)	Regional Government Overlay	Market maturity	Project Parameters	Drainage Strategy	Pavement base	Construction techniques / Outputs	Statutory Obligations	QA/ Critical Hold Point Standard testings	Process/program	Reporting & Benchmarks	Reporting	Annual Assessment	Re-testing	Sustainability Indices	Retesting of System Components	Sinking Fund Strategy
A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	D1	D2	D3	D4	D5	E1	E2	E3	E4	E5	F1	F2	F3

## Smart Standards Continuum

1. Planning			S	M	A	R	T
A1	Environmental Sustainability	UN's SDG's: Enviromental Protection Agency (clean air, clean water etc)					
A2	Community Standards /Usage	Minimum number for court/field, Population projections for fields					
A3	Economic & Social Value Rol	Impact on GDP, Health care cost savings, RoI on Whole of Life Costs					
A4	Fit For Purpose	Definitions of surface standards for type of play, IF's; national bodies, state overlays					

**SMART = Specific – Measurable – Achievable – Realistic – Timely**

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# 3. The SMART Standards Continuum

## Smart Standards Continuum

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4. Construction			S	M	A	R	T
D1	Drainage Strategy	Annual rain event = Hydrology testing,					
D2	Pavement base	Compaction levels (98% etc)					
D3	Construction techniques / Outputs	Concrete standards					
D4	Statutory Obligations	Pollution					

**SMART** = **S**pecific – **M**easurable – **A**chievable – **R**ealistic – **T**imely

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# 3. The SMART Standards

## Smart 40 page Action Plan

- Project description
- ID all standards for each phase
- Everyone Signs off

## BEFORE WE START WRITING THE SPECIFICATION

Ref.	Aspect	Action																																																																
<b>9. Civil and Special Requirements</b>																																																																		
	Detailed Design Drawings	The contractor must provide the following drawings as part of tender <ul style="list-style-type: none"> <li>• None</li> </ul>																																																																
	Drainage Consideration's	<ul style="list-style-type: none"> <li>• What annual rain event should be considered?</li> <li>• Please refer to the extract below from the Australian Rainfall and Runoff (ARR) regarding comparison of AEP and ARI. As you can see the previous 1 in 10 ARI is almost the same as <b>the 10% AEP</b>. To be correct it should be 10% AEP as reference to ARI is incorrect now being removed.</li> <li>• Is there a nominated Legal Point of Discharge</li> <li>• Does Council require post-development stormwater discharge from the site to be equal to or less than the pre-development flows</li> </ul> <p style="text-align: center;"><b>Table 1. EY, AEP, ARI preferred usage</b></p> <table border="1"> <thead> <tr> <th>EY</th> <th>AEP (%)</th> <th>AEP (1 in x)</th> <th>ARI</th> <th>Uses in Engineering Design</th> </tr> </thead> <tbody> <tr><td>6</td><td>99.75</td><td>1.002</td><td>0.17</td><td rowspan="4">Water sensitive urban design</td></tr> <tr><td>4</td><td>98.17</td><td>1.02</td><td>0.25</td></tr> <tr><td>3</td><td>95.02</td><td>1.05</td><td>0.33</td></tr> <tr><td>2</td><td>86.47</td><td>1.16</td><td>0.50</td></tr> <tr><td>1</td><td>63.21</td><td>1.58</td><td>1.00</td><td rowspan="4">Stormwater/pit and pipe design</td></tr> <tr><td>0.69</td><td>50.00<sup>1</sup></td><td>2</td><td>1.44</td></tr> <tr><td>0.5</td><td>39.35</td><td>2.54</td><td>2.00</td></tr> <tr><td>0.22</td><td>20.00<sup>1</sup></td><td>5</td><td>4.48</td></tr> <tr><td>0.2</td><td>18.13</td><td>5.52</td><td>5.00</td><td rowspan="6">Floodplain management and</td></tr> <tr><td>0.11</td><td>10.00</td><td>10</td><td>9.49</td></tr> <tr><td>0.05</td><td>5.00</td><td>20</td><td>19.5</td></tr> <tr><td>0.02</td><td>2.00</td><td>50</td><td>49.5</td></tr> <tr><td>0.01</td><td>1.00</td><td>100</td><td>100</td></tr> <tr><td>0.005</td><td>0.50</td><td>200</td><td>200</td></tr> </tbody> </table>	EY	AEP (%)	AEP (1 in x)	ARI	Uses in Engineering Design	6	99.75	1.002	0.17	Water sensitive urban design	4	98.17	1.02	0.25	3	95.02	1.05	0.33	2	86.47	1.16	0.50	1	63.21	1.58	1.00	Stormwater/pit and pipe design	0.69	50.00 <sup>1</sup>	2	1.44	0.5	39.35	2.54	2.00	0.22	20.00 <sup>1</sup>	5	4.48	0.2	18.13	5.52	5.00	Floodplain management and	0.11	10.00	10	9.49	0.05	5.00	20	19.5	0.02	2.00	50	49.5	0.01	1.00	100	100	0.005	0.50	200	200
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	Pavement design	What pavement design life would Council expect																																																																
	Parking requirements	Are additional requirements needed to be considered We need to provide options for a buss drop off zone near fields and also an "entrance" to that part of the site.... With a common congregating area between the northern fields and the new SFC area / field																																																																
	Site shed and contractor's area	Approximately 800m <sup>2</sup> of area on the field or close to hold storage and site equipment – where can this be housed – <b>car park</b>																																																																
	Site signage	Does the Uni want advertising signage of the development – if so, who is going to develop this and what information do you need from the contractor and when? <b>NO</b>																																																																
<b>10. Earth Works</b>																																																																		
	Site history	<ul style="list-style-type: none"> <li>• Is there any specific site conditions known to the uni (i.e. previous land fill, etc.)</li> </ul> Does the Uni have any objections to specific subgrade remedial works (i.e. impact rolling, etc.) <b>tbc</b>																																																																

# 3. The SMART Standards Continuum

Critical Hold Points...  
...to check standards

Ref.	Clause / Item	Witness	Hold	Approval	Notice Needed	Release/sign off
<b>Prior to Contract Starting</b>						
9	Site Management Plan.			Yes	3 days	Super intendent
10	The Contractor must provide a Traffic Management Plan and Traffic Guarantee Scheme at least 7 days prior to works and preparation on site, or earlier if required.			Yes	3 days	Super intendent
11	Construction size approvals at least 7 days prior to start.			Yes	3 days	Super intendent
12	Confirmation of hours of work will conform to the specified hours.			Yes	3 days	Super intendent
<b>Earthworks</b>						
	Subgrade affected by moisture	Yes			3 days	Super-intendent
	Placing fill	Yes			3 days	Super-intendent
	Compaction	Yes			3 days	Super-intendent
	Proof roll	Yes			3 days	Super- intendent
	Excavating service trenches	Yes			3 days	Super-intendent
	Backfilling services trenches	Yes			3 days	Super- intendent
	Bad ground		Yes		1 day	Super-intendent
	Compaction Tests		Yes		3 days	Super-intendent
	CBR Tests		Yes		3 days	Super-intendent
	Sediment and Erosion Control Plan		Yes		5 days	Super-intendent
<b>Stormwater</b>						
	Testing and inspections			Yes	3 days	Super-intendent
	Formwork			Yes	3 days	Super-intendent
	Backfill			Yes	3 days	Super-intendent
	Pipe Laying			Yes	3 days	Super-intendent
	Trench backfill			Yes	3 days	Super-intendent
	Backfill density testing		Yes		3 days	Super-intendent
	Pipe bedding material		Yes		3 days	Super-intendent
<b>In-Situ Concrete</b>						

# 4. The Importance of Testing

*To test, what to test or not to test, that is the question*

- Testing should be seen as part of the Quality Assurance of the project
- Its more than receiving the 'badge' from the International Federation... or being hard on the Contractors
- Its about ensuring that the field is Fit for Purpose...
- Testing therefore needs to be considered at each stage of the project...
- We need to stop being dinosaurs and start being leaders in the sector ... and understanding standards helps us...
- We need to measure performance on the Project – not just the end result



**When performance is measured,  
performance improves. When  
performance is measured and  
reported, the rate of  
improvement accelerates.**

**-Thomas S. Monson**

## 6. Conclusion

- **Standards are there to help us understand and procure the best system that is fit for purpose**
- **Standards are more than just the IF standards**
- **Standards are for the whole project**
- **The IF standards are the starting point not the END GAME...**



**The quality of a leader is  
reflected in the standards they  
set for themselves.**

Ray Kroc

# SPORT INSPIRES A NATION

Synthetic Sports Surfaces Create the  
Opportunities for All Generations

smarter  
synthetic  
solutions



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