



NEW CHINESE COMPULSORY STANDARDS

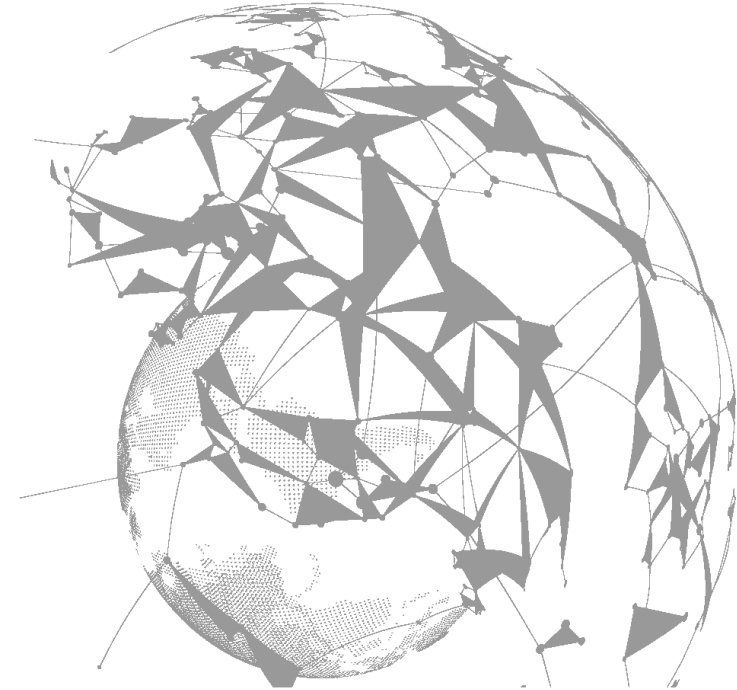
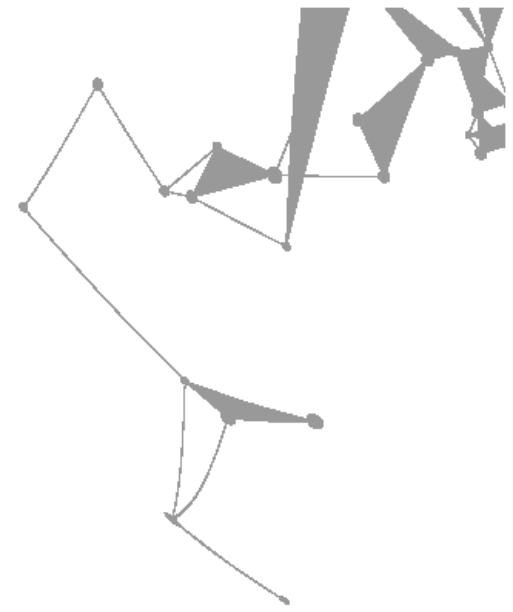
GB 36246-2018
Sports areas with synthetic surfaces
for primary and middle schools

Dr. Chen Chen

Oct.2018 ISSS Meeting Italy

/01

Backgrounds and Timeline



CONTENTS



1. Backgrounds and Timeline

- Oct 2015, Outburst of “poisonous tracks” news all over China
- GB/T 14833-2011, GB/T 22517-2011, GB/T 19851.6-2005
- Jun 2016, First Meeting to rewrite GB/T 19851.6-2005
- From recommendatory standard to compulsory standard
- New standard number GB 36246-2018
- Published on May, 2018; Standards implementation date: Nov 1st, 2018

2. Limits for Hazardous Chemicals

- Major Concern
- Focused on VOCs
- New testing methods

3. Physical Properties

- Close to EN standards



停课

停课

停课



GB/T 14833-2011 Synthetic Track Surfaces

Physical Properties

- Shock Absorption 35-50%
- Deformation 0.6-2.5mm
- Tensile Strength $\geq 0.5\text{Mpa}$
- Elongation $\geq 40\%$
- Friction $\geq 47\%$

Limits of Hazardous Materials

- Benzene $\leq 0.05 \text{ g/kg}$
- Toluene, Xylene $\leq 0.05 \text{ g/kg}$
- TDI $\leq 0.2 \text{ g/kg}$
- Pb $\leq 90 \text{ mg/kg}$
- Cd $\leq 10 \text{ mg/kg}$
- Cr $\leq 10 \text{ mg/kg}$
- Hg $\leq 2 \text{ mg/kg}$

VOICES:

- **WEAK**
- **OUT of DATE**
- **LACK of CHEMICAL LIMITS**
- **NO VOCS**

Jun, 2016

Educational Equipment Research & Development Center, Ministry of Education
Organized a committee to rewrite GB/T 19851.6-2005 (later renamed as GB 36246)

Includes:

- 3 Universities
- 4 Government offices
- 7 Testing Institutes
- 2 Industry Association
- 9 Manufacturers

ICS 03.180
Y 55



中华人民共和国国家标准

GB 36246-2018

代替GB/T 19851.11-2005

中小学合成材料面层运动场地

Sports areas with synthetic surfaces for primary and middle schools

2018-05-14发布

2018-11-01 实施

中华人民共和国国家质量监督检验检疫总局
中国国家标准化管理委员会 发布



当众体育

/02 Limits of Hazardous Chemicals

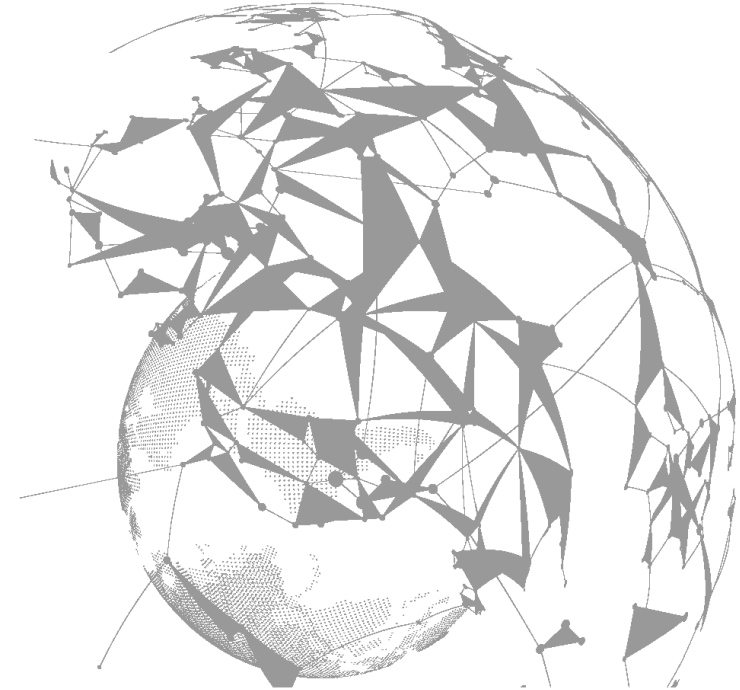
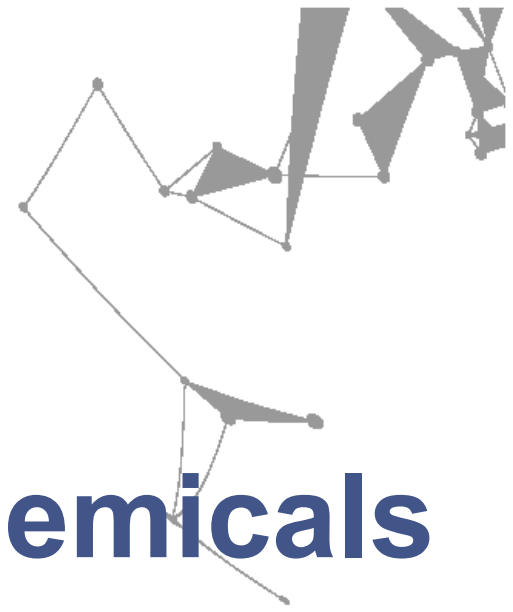


Table 5

Limits and odor requirements for hazardous substances in solid raw material

| | Item | index |
|-----------------------------|------------------------------|------------------|
| Hazardous substance content | The sum of 18 PAHs/(mg/kg) | ≤50 |
| | | ≤20 ^c |
| | Benzo[a]pyrene/(mg/kg) | ≤1.0 |
| | Soluble lead / (mg / kg) | ≤50 |
| | Soluble cadmium / (mg / kg) | ≤10 |
| | Soluble chromium / (mg / kg) | ≤10 |
| | Soluble mercury / (mg / kg) | ≤2 |
| odor | Odor level d/grade | ≤3 |

a Prefabricated synthetic surface layer and artificial grass before laying are not tested as solid raw materials.

b The specific names of 18 polycyclic aromatic hydrocarbons are given in Appendix F.

c This applies only to synthetic material particles filled with artificial grass.

d The odour level is determined only for the synthetic grass granules filled with synthetic material particles.

Table 4

Limit requirements for hazardous substances in non-solid materials

| Item | index |
|--|-------|
| The sum of three phthalate compounds (DBP, BBP, DEHP) a/(g/kg) | ≤1.0 |
| The sum of three phthalate compounds (DNOP, DINP, DIDP) a/(g/kg) | ≤1.0 |
| Short chain chlorinated paraffin (C10-C13) / (g / kg) | ≤1.5 |
| The sum of free TDI and HDI / (g / kg) | ≤10 |
| Volatile Organic Compounds / (g / L) | ≤50 |
| Free formaldehyde / (g / kg) | ≤0.50 |
| Benzene / (g / kg) | ≤0.05 |
| Total toluene, xylene and ethylbenzene / (g / kg) | ≤1.0 |
| Soluble lead b/(mg/kg) | ≤50 |
| Soluble cadmium b/(mg/kg) | ≤10 |
| Soluble chromium b/(mg/kg) | ≤10 |
| Soluble mercury b/(mg/kg) | ≤2 |

Note: For multi-component samples, the sum of free toluene diisocyanate (TDI) and free hexamethylene diisocyanate (HDI) should be tested for free toluene diisocyanate (TDI) and free hexamethylene diisocyanate (HDI) in the curing agent sample. The content is calculated according to the construction ratio indicated by the product, and other test items are measured according to the construction ratio indicated by the product.

a The specific names of a phthalate compounds are given in Appendix E.

b Only detect non-solid materials with added pigments and fillers.

Limits and odor requirements for hazardous substances in finished products of synthetic materials

| | Item | Index |
|---------------------------------|---|-------|
| Emission of Hazardous Chemicals | Total Volatile Organic Compounds (TVOC) / (mg / (m ² • h)) | ≤5.0 |
| | Formaldehyde / (mg / (m ² • h)) | ≤0.3 |
| | Benzene / (mg / (m ² • h)) | ≤0.1 |
| | The sum of toluene, xylene and ethylbenzene / (mg / (m ² • h)) | ≤1.0 |
| | Carbon disulfide / (mg / (m ² • h)) | ≤7.0 |
| Odor | Odour level/level | ≤3 |

aThe specific names of a phthalate compounds are given in Appendix E.

b The specific names of 18 polycyclic aromatic hydrocarbons are given in Appendix F.

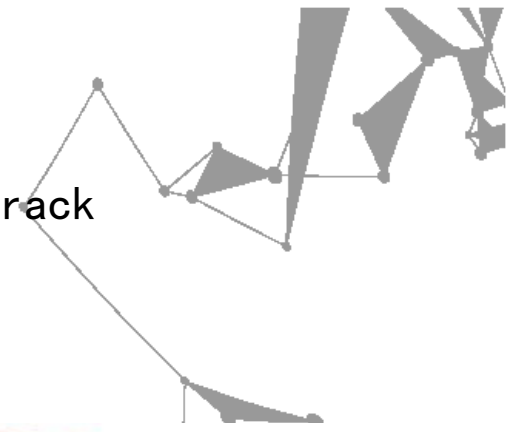
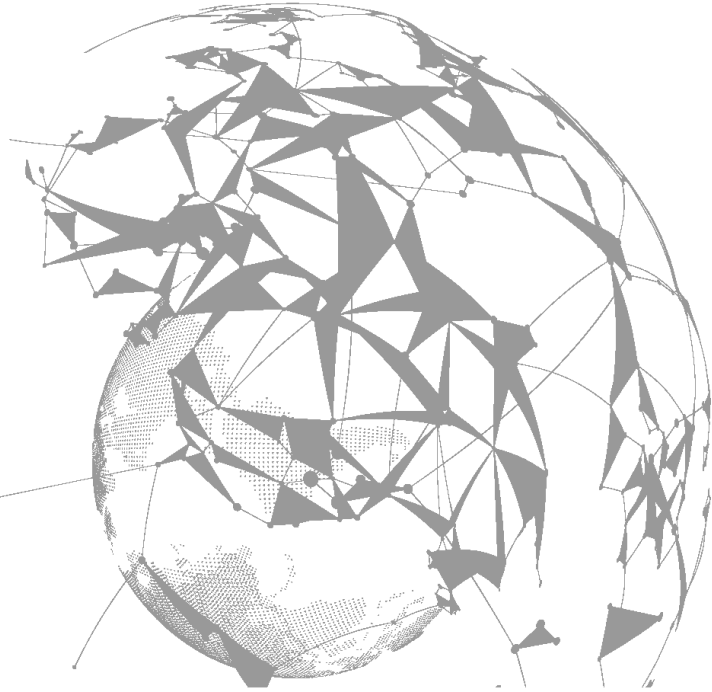
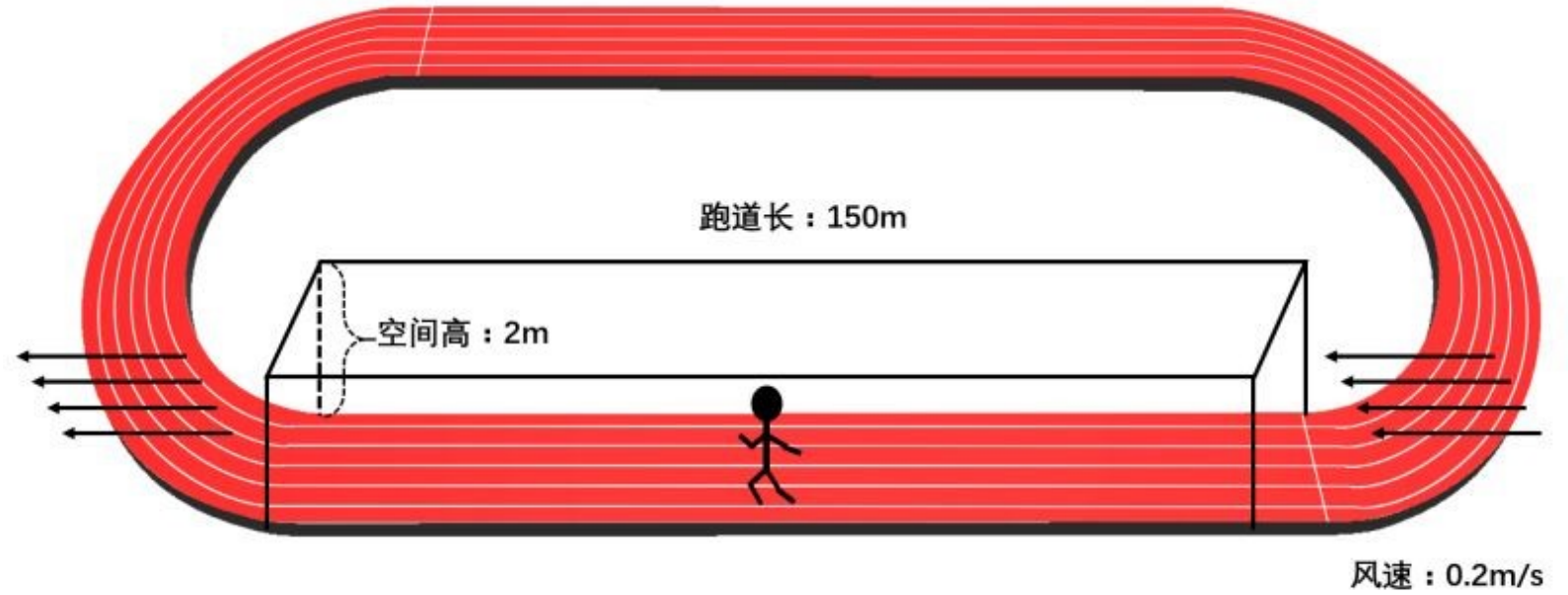
This applies to the surface of the finished surface of the

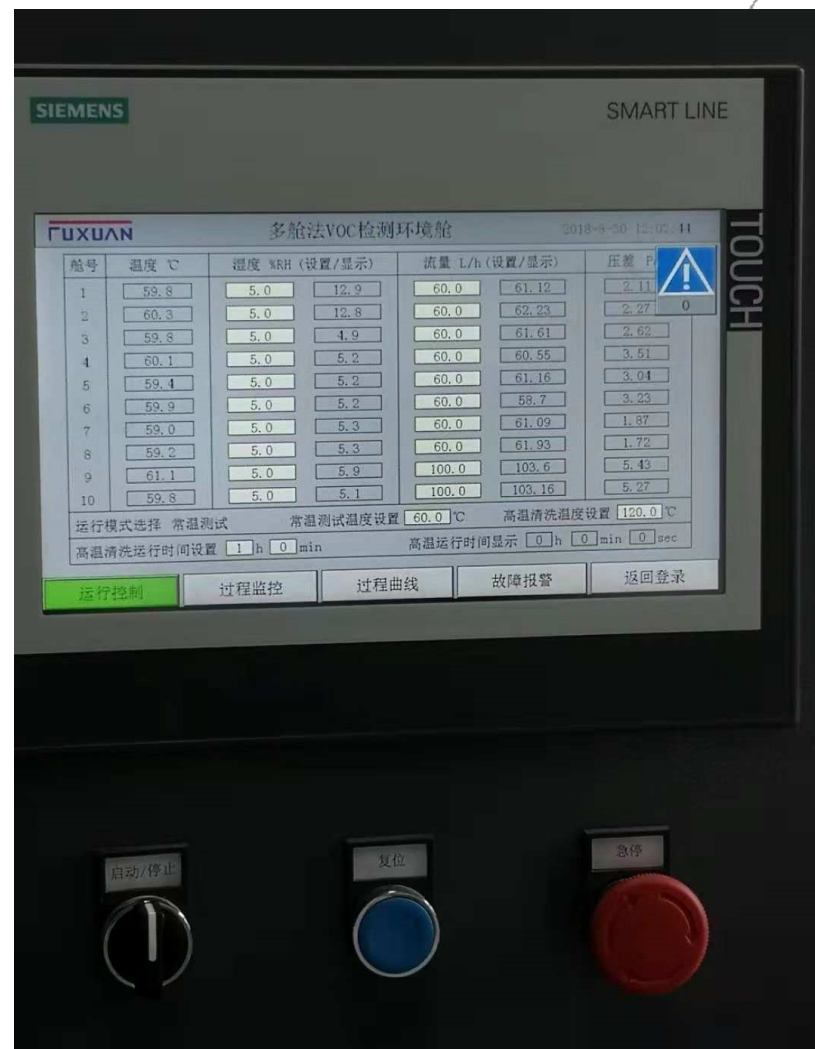
C synthetic material within 5 mm, excluding the artificial grass surface.

| | Item | Index | |
|-----------------------------|---|-------|------------------|
| Hazardous Chemicals Content | The sum of three phthalate compounds (DBP, BBP, DEHP) a/(g/kg) | ≤1.0 | |
| | The sum of three phthalate compounds (DNOP, DINP, DIDP) a/(g/kg) | ≤1.0 | |
| | The sum of 18 polycyclic aromatic hydrocarbons b/(mg/kg) | | ≤50 |
| | | | ≤20 ^c |
| | Benzo[a]pyrene/(mg/kg) | ≤1.0 | |
| | Short chain chlorinated paraffin (C10-C13) / (g / kg) | ≤1.5 | |
| | 4,4'-diamino-3,3'-dichlorodiphenylmethane (MOCA)/(g/kg) | ≤1.0 | |
| | Total toluene diisocyanate (TDI) and free hexamethylene diisocyanate (HDI) / (g / kg) | ≤0.2 | |
| | Free diphenylmethane diisocyanate (MDI) / (g / kg) | ≤1.0 | |
| | Soluble lead / (mg / kg) | ≤50 | |
| | Soluble cadmium / (mg / kg) | ≤10 | |
| | Soluble chromium / (mg / kg) | ≤10 | |
| | Soluble mercury / (mg / kg) | ≤2 | |

**Testing Method:
Using Small Environmental
Chambers(60L) , @ 60°C**

Schematic diagram of emission of hazardous materials from synthetic track





Small Environmental Chambers(60L)

/03 Physical Properties

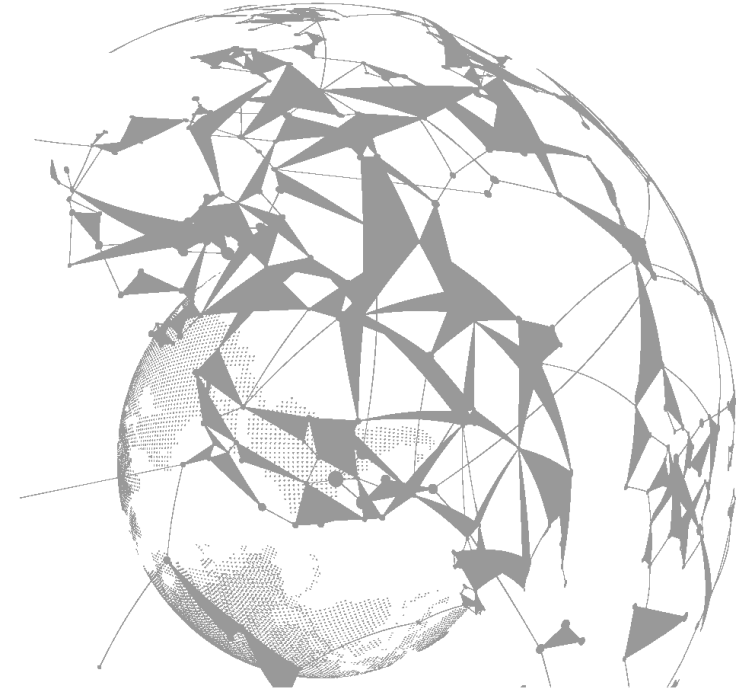
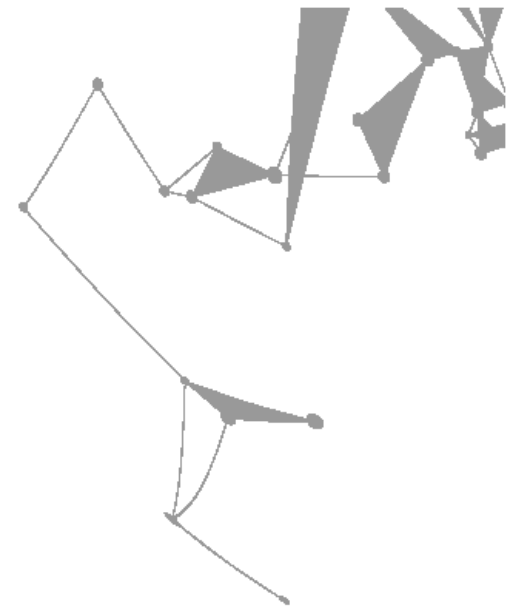


Table 1, Thickness requirement for synthetic sports surfaces

| TYPE | | REQUIREMENTS |
|-----------------|---------------|--------------|
| Athletic Tracks | 400 Meter | ≥13 mm |
| | Non-400 Meter | ≥13 mm |
| Ball Courts | | ≥8 mm |
| Playgrounds | | ≥10 mm |

^a Not includes professional acrylic surfaces and synthetic turfs

Table 2, Physical properties of synthetic sports surfaces

| ITEM | | REQUIREMENTS |
|--|-----------------|----------------|
| Shock absorption/ (%, 0 °C ~ 50 °C) | Athletic Tracks | 35 ~ 50 |
| | Ball Courts | 20 ~ 50 |
| | Playgrounds | 25 ~ 50 |
| Deformation/ (mm) | | 0.6 ~ 3.0 |
| Slip Resistance / (BPN, 20 °C) | Athletic Tracks | ≥47 (wet) |
| | Ball Courts | 80 ~ 110 (dry) |
| Tensile Strength/ (MPa) | permeable | ≥0.4 |
| | Non-permeable | ≥0.5 |
| Elongation/ (%) | | ≥40 |
| Fire resistance | | I |

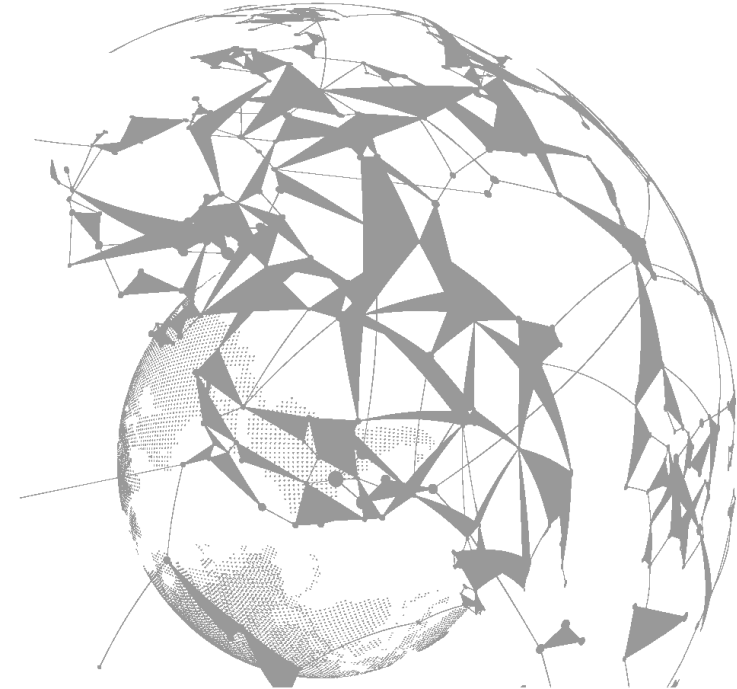
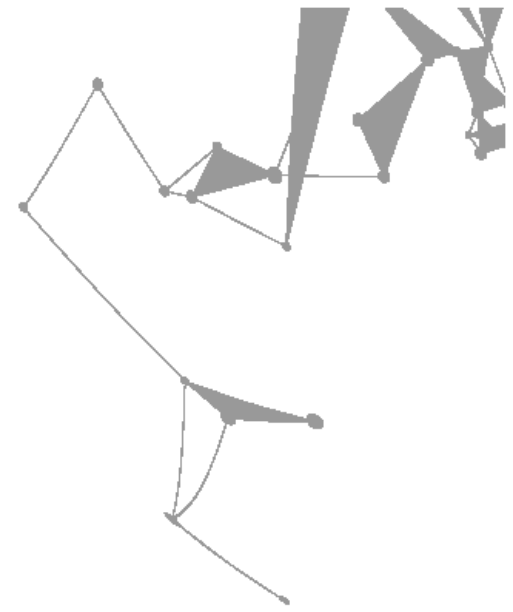
^a Not includes professional acrylic surfaces and synthetic turfs

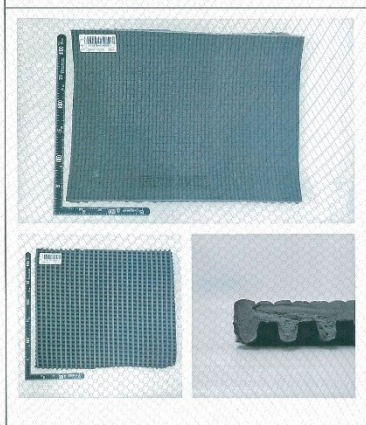
Table 3, Physical properties of synthetic turf

| ITEM | REQUIREMENTS |
|------------------------------------|--------------|
| Shock absorption (%, 0 °C ~ 50 °C) | 45-70 |
| Deformation/ (mm) | 4-11 |
| 草丝拉断力 (开网丝) /(N) | ≥60 |
| 草丝拉断力 (单丝) /(N) | ≥10 |
| 单簇草丝拔出出力/ (N) | ≥20 |
| 老化试验后草丝拉断力保留率/% | ≥80 |

Very similar to EN14877

/04 Sample Reports





建筑材料工业环境监测中心

(ECO-building Material Test Center)

检验报告

(Test Report)

号: CY2018N01A00011

第2页 共3页

| 检验项目 | 标准要求 | 检验结果 | 单项结论 | 检验依据 |
|-----------------|------|-------|------|--|
| 种多环芳烃总和/(mg/kg) | ≤50 | 未检出* | 符合 | GB 36246-2018 附录 B |
| 苯并[a]芘/(mg/kg) | ≤1.0 | 未检出* | 符合 | |
| 可溶性铅/(mg/kg) | ≤50 | 未检出* | 符合 | GB 36246-2018 6.12.2.7 GB/T 23991-2009 |
| 可溶性镉/(mg/kg) | ≤10 | 未检出* | 符合 | |
| 可溶性铬/(mg/kg) | ≤10 | 未检出* | 符合 | |
| 可溶性汞/(mg/kg) | ≤2 | 未检出* | 符合 | |
| 7 无机填料含量/% | ≤65 | 57.68 | 符合 | GB 36246-2018 6.10 GB/T 4498.1-2013 |

(以下空白)

备注: 未检出*: 18种多环芳烃: 萘、苊烯、苊、芴、菲、蒽、荧蒽、芘、苯并[a]蒽、蒽、苯并[b]荧蒽、苯并[k]荧蒽、苯并[j]荧蒽、二苯并[a,h]蒽、苯并[a]芘、苯并[e]芘、苯并[g,h,i]芘、茚并[1,2,3-cd]芘均<0.1mg/kg;
可溶性铅<2.5mg/kg; 可溶性镉<0.5mg/kg;
可溶性铬<1mg/kg; 可溶性汞<0.1mg/kg。



建筑材料工业环境监测中心

(ECO-building Material Test Center)

检验报告

(Test Report)

号: CY2018N01A00014

第2页 共3页

| 检验项目 | 标准要求 (表7) | 检验结果 | 单项结论 | 检验依据 |
|--|--------------|------|------|--|
| 苯二甲酸酯类化合物 BP、DEHP)总和/(g/kg) | ≤1.0 | 未检出* | 符合 | GB 36246-2018 6.15.4 附录 A |
| 苯二甲酸酯类化合物 , DINP、DIDP)总和/ (g/kg) | ≤1.0 | 未检出* | 符合 | |
| 石蜡(C ₁₀ -C ₁₃)/(g/kg) | ≤1.5 | 未检出* | 符合 | GB 36246-2018 附录 G |
| 二异氰酸酯(TDI)和 甲基二异氰酸酯(HDI) 总和/(g/kg) | ≤10 | 未检出* | 符合 | GB 36246-2018 6.15.3 GB/T 18446-2009 |
| 挥发性有机化合物/(g/L) | ≤50 | 未检出* | 符合 | GB 36246-2018 6.15.6 GB/T 23986-2009 |
| 6 游离甲醛/(g/kg) | ≤0.50 | 未检出* | 符合 | GB 36246-2018 6.15.1 GB 18583-2008 |
| 7 苯/(g/kg) | ≤0.05 | 未检出* | 符合 | GB 36246-2018 6.15.2 GB 18581-2009 |
| 8 甲苯、二甲苯和乙苯总和/(g/kg) | ≤1.0 | 未检出* | 符合 | |
| 9 可溶性铅/(mg/kg) | ≤50 | 未检出* | 符合 | GB 36246-2018 6.15.7 GB/T 23991-2009 |
| 10 可溶性镉/(mg/kg) | ≤10 | 未检出* | 符合 | |
| 11 可溶性铬/(mg/kg) | ≤10 | 未检出* | 符合 | |
| 12 可溶性汞/(mg/kg) | ≤2 | 未检出* | 符合 | |

备注: 未检出*: DBP、BBP、DEHP、DNOP 均<0.01g/kg;
DINP、DIDP 均<0.05g/kg; 短链氯化石蜡<0.1g/kg;
TDI、HDI 均<0.1g/kg; 挥发性有机化合物<2g/L; 游离甲醛<0.05g/kg;
苯<0.02g/kg; 甲苯、二甲苯、乙苯均<0.02g/kg;
可溶性铅<2.5mg/kg; 可溶性镉<0.5mg/kg;
可溶性铬<1mg/kg; 可溶性汞<0.1mg/kg。

广州质量监督检测研究院
检验检测报告

报告编号: 建委2018-07-0210

第 2 页 共 3 页

| 序号 | 检验项目 | 单位 | 标准要求 | 检验结果 | 单项评价 |
|----------------|--|------------------------|---------------------------|-------|------|
| | | | 塑胶面层成品 | --- | |
| 有害物质释放量 | | | | | |
| 1 | 总挥发性有机化合物 (TVOC) | mg/(m ² ·h) | ≤5.0 | 0.8 | 符合 |
| 2 | 甲醛 | mg/(m ² ·h) | ≤0.4 | 0.012 | 符合 |
| 3 | 苯 | mg/(m ² ·h) | ≤0.1 | 未检出 | 符合 |
| 4 | 甲苯、二甲苯和乙苯总和 | mg/(m ² ·h) | ≤1.0 | 0.02 | 符合 |
| 5 | 二硫化碳 | mg/(m ² ·h) | ≤7.0 | 6.4 | 符合 |
| 有害物质含量 | | | | | |
| 6 | 3种邻苯二甲酸酯类 (DEP、BBP、DEHP) 总和 | g/kg | ≤1.0 | 0.41 | 符合 |
| 7 | 3种邻苯二甲酸酯类 (DNP、DINP、DIDP) 总和 | g/kg | ≤1.0 | 未检出 | 符合 |
| 8 | 18种多环芳烃总和 | mg/kg | ≤50 | 未检出 | 符合 |
| 9 | 18种多环芳烃总和 | mg/kg | ≤20 (取合成材料面层上表面5mm以内部分测试) | 未检出 | 符合 |
| 10 | 苯并(a)芘 | mg/kg | ≤1.0 | 未检出 | 符合 |
| 11 | 短链氯化石蜡 (C ₁₀ -C ₁₃) | g/kg | ≤1.5 | 未检出 | 符合 |
| 12 | 4,4'-二氨基-3,3'-二氯二苯甲烷 (MOCA) | g/kg | ≤1.0 | 未检出 | 符合 |
| 13 | 游离甲苯二异氰酸酯 (TDI) 和游离六亚甲基二异氰酸酯 (HDI) 总和 | g/kg | ≤0.2 | 未检出 | 符合 |
| 14 | 游离二苯基甲烷二异氰酸酯 (MDI) | g/kg | ≤1.0 | 未检出 | 符合 |
| 15 | 气味等级 | 级 | ≤3 | 3 | 符合 |
| 16 | 可溶性铅 | mg/kg | ≤50 | 未检出 | 符合 |
| 17 | 可溶性镉 | mg/kg | ≤10 | 未检出 | 符合 |

批准: 董志祥 审核: 叶元望 主检: 利剑飞



广州质量监督检测研究院
检验检测报告

报告编号: 建委2018-07-0210

第 3 页 共 3 页

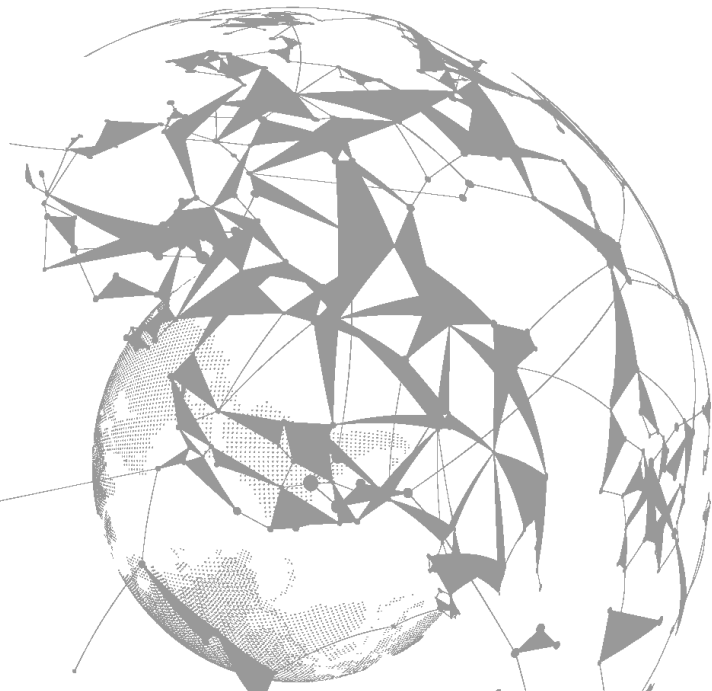
| 序号 | 检验项目 | 单位 | 标准要求 | 检验结果 | 单项评价 |
|-------------|----------------|-------|-----------------|------|------|
| | | | 塑胶面层成品 | --- | |
| 18 | 可溶性铬 | mg/kg | ≤10 | 未检出 | 符合 |
| 19 | 可溶性汞 | mg/kg | ≤2 | 未检出 | 符合 |
| 物理性能 | | | | | |
| 20 | 冲击吸收 | % | 田径场地: 35~50 | 41 | 符合 |
| 21 | 垂直变形 | mm | 0.6~3.0 | 2.2 | 符合 |
| 22 | 抗滑值 (BPN, 20℃) | --- | 田径场地: ≥47 (湿测) | 72 | 符合 |
| 23 | 拉伸强度 | MPa | 非渗水型面层: ≥0.5 | 0.67 | 符合 |
| 24 | 拉伸伸长率 | % | ≥40 | 111 | 符合 |
| 25 | 阻燃 | --- | I 级 (燃斑直径≤50mm) | I 级 | 符合 |

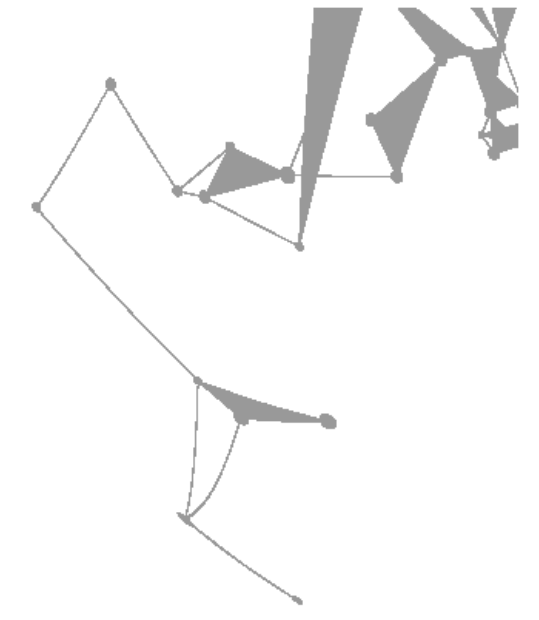
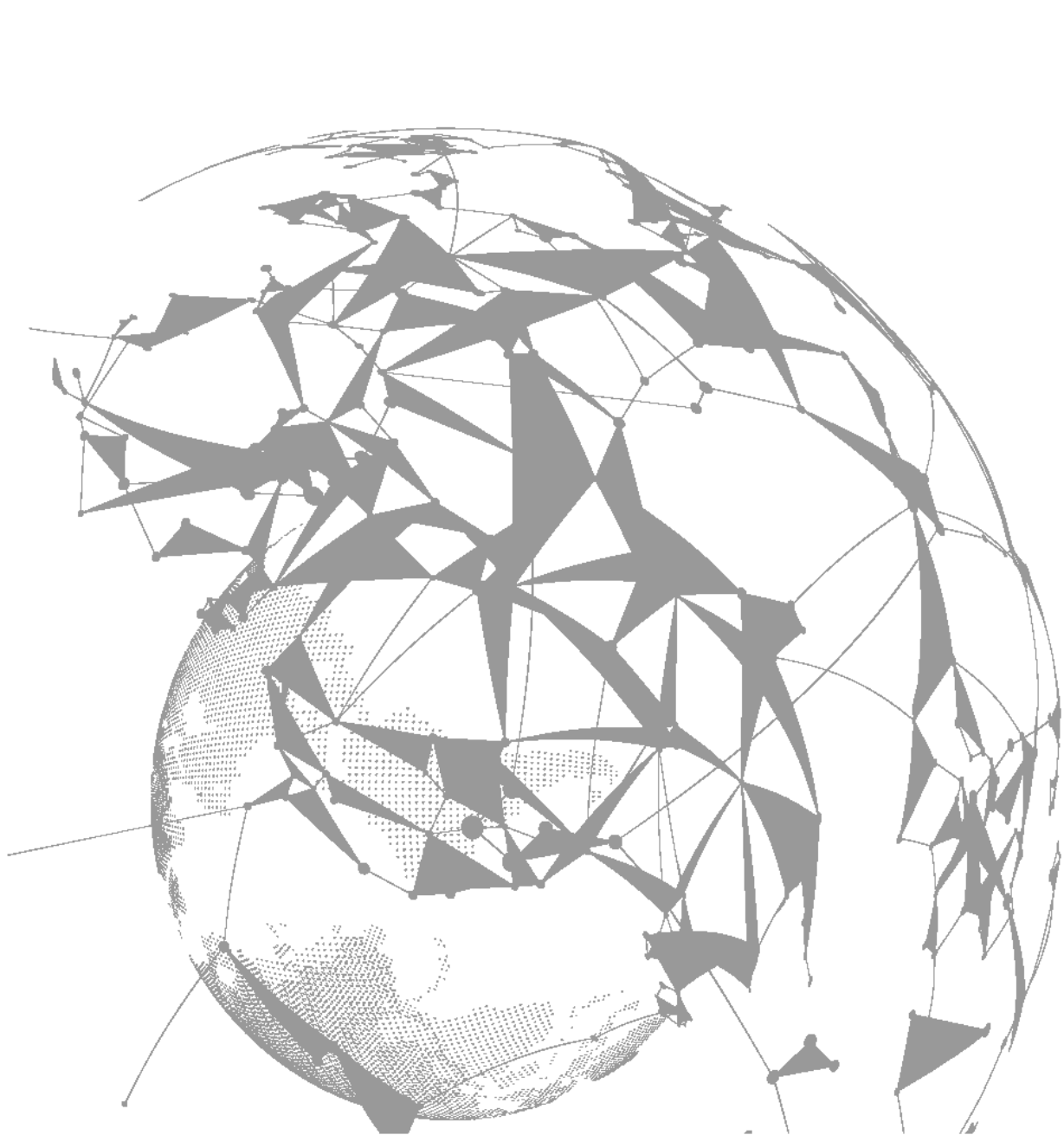
1. DBP、BBP、DEHP、DNOP检出限均为0.01g/kg;
2. DINP、DIDP检出限均为0.05g/kg;
3. 短链氯化石蜡 (C₁₀-C₁₃) 检出限为0.1g/kg;
4. 游离甲苯二异氰酸酯 (TDI) 和游离六亚甲基二异氰酸酯 (HDI) 总和检出限为0.1g/kg;
5. 18种多环芳烃检出限均为0.1mg/kg;
6. 苯并(a)芘检出限为0.1mg/kg;
7. 4,4'-二氨基-3,3'-二氯二苯甲烷 (MOCA) 检出限为0.01g/kg;
8. TVOC、苯、甲苯+二甲苯+乙苯总和和释放率检出限均为0.001mg/(m²·h);
9. 二硫化碳释放量的检出限为0.02mg/(m²·h);
10. 游离二苯基甲烷二异氰酸酯 (MDI) 检出限为0.1g/kg;
11. 可溶性铅、可溶性镉、可溶性铬检出限均为1.0mg/kg;
12. 可溶性汞检出限为0.1mg/kg.

批准: 董志祥 审核: 叶元望 主检: 利剑飞



Problems





Thanks

Dr. Chen Chen

Oct. 2018 ISSS Technical Meeting