

EL257. Artificial turf and other turf materials

[EL257-2012/3/2015-5]



1. Scope

This standard is applied to artificial turf products and other related products that can be sold separately, such as artificial turf mats and absorbing pads. However, the shock absorbing pad with a structure that allows it to be mixed with other materials and then installed on-site, and natural raw infill materials such as silica sands shall be excluded.

2. Definition

Note) Terms and definitions in “KS M 3888-1 (School Athletic Facilities – Artificial Turf)” shall be applied, except for the following:

2.1 “Artificial Turf” refers to various types of alternatives to natural turf designed for outdoor use such as sports ground, athletic facility, or leisure facility, which can be classified as follows.

2.1.1.

One that can be used as an artificial grass mat independently

2.1.2

One that can be used only after applying infill materials onto an artificial grass mat

2.1.3

One that can be used only after an impact-absorbing layer of a shock pad is placed under an artificial grass mat

2.1.4

One that can be used when an underlayment of both infill and a shock pad are installed

2.2

“Artificial grass mat” refers to a short-pile synthetic turf constructed on top of woven fabric.

2.3

“Woven Fabric” refers to stabilizing fabrics that are used to secure turf piles.

2.4

“Turf Pile” refers to synthetic resins or fibers that are fixed at their lower ends to the woven fabric, through which the shape of turf is formed.

2.5

“Infill materials” refers to granular materials that are used to fill the gaps for the purpose of stabilization or shock absorption.

2.6

“Shock Absorbing Pad” refers to a plate shaped material made of rubber or synthetic resin that is used as shock-absorbing material for the users of artificial turf.

2.7.

“Phthalates” refers to a substance that is used to add flexibility to synthetic resin such as PVC or solvent for liquid phase chemical products, which can be classified as 1, 2-benzenedicarboxylic acid.

2.8

The term “PAHs” (polycyclic aromatic hydrocarbons) generally refers to polycyclic aromatic hydrocarbons built with two or more benzene rings.

3. Certification Criteria

3.1 Environmental Criteria

Note) The chemicals covered under this standard are applied in connection with the corresponding chemical names and CAS numbers identified in the <attachment> list of chemicals.

3.1.1

The following criteria shall be satisfied in relation to the use of chemical substances during the manufacturing process.

3.1.1.1 The following substances shall not be used in turf pile.

Note) This criteria does not apply to yarns that comprise 5% or less of the product by weight.

- a) Allergic disperse dyes and carcinogenic dyes, as specified in the <attachment>.
- b) Dyes and pigments in which lead(Pb), cadmium(Cd), mercury(Hg), hexavalent chromium(Cr6+), or their compounds are used as raw material.
- c) Flame retardants, as specified in the <attachment>.
- d) Phthalates shall not be used if PVC is used. This requirement is considered as having been satisfied if the total content of the phthalates used in the product is less than 0.1 weight %.
Note) The total content of phthalates shall be counted as the sum of contents on each substance in accordance with the <attachment>.
- e) Chlorinated benzene and chlorinated toluene, as specified in the <attachment>.
- f) Alkylphenol- ethoxylates(APEOs), alkylphenol derivates(APDs), dimethyl ammonium chloride(DTDMAC), distearyl di-methyl ammonium chloride(DSDMAC), and nitrilotriacetic acid(NTA) as the ingredients of cleaner or conditioner.

3.1.1.2

Organic solvents shall not be used when coating the woven fabric, and the contents of DMF (dimethylformamide) in the woven fabric shall be equal to or less than 10 mg/kg.

3.1.1.3

If adhesives used in the products are not E-mark certified as 'Adhesive (EL251),' one of the target product certification criteria, the requirements specified in '3.1.1 Environmental Criteria' of EL251 shall be satisfied.

3.1.2

With respect to the issue of toxic emissions and safety while in use, infill materials and shock absorbing pads shall satisfy the following requirements. However, simply-processed organic and inorganic materials such as silica sands or wood chips shall be exempt from these requirements.

3.1.2.1

The sum of each content of benzene, toluene, ethylbenzene and xylene shall be 50 mg/kg or less, and the content of benzene shall be 1 mg/kg or less.

3.1.2.2

The content of PAHs shall meet the following requirements.

Classification	Infill	Shock absorbing pad
benzo[a]pyrene [mg/kg]	1 or lower	20 or lower
Total contents of each item in <attachment>	10 or lower	200 or lower

3.1.2.3

The content of zinc (Zn) shall be 25,000 mg/kg or lower.

3.1.3

The hazardous substances included in the turf mat, infill and shock absorbing pad shall meet the following requirements with respect to the emissions of water and soil-originated pollutants while the product is in use or being disposed of. However, simply-processed organic and inorganic materials such as silica sands or wood chips shall be exempt from these requirements.

Substance	Criteria [mg/L]
Cadmium (Cd)	0.3 or lower
Lead (Pb)	3 or lower
Hexavalent chromium (Cr ⁶⁺)	1.5 or lower
Mercury (Hg)	0.005 or lower
Arsenic (As)	1.5 or lower
Copper (Cu)	3 or lower
Cyan (CN ⁻)	1 or lower

3.1.4

One of the following requirements shall be satisfied in relation to the reduction of the emissions of hazardous substances while the product is in use, and the reduction of waste while the product is disposed of.

3.1.4.1

The applicant shall establish, implement and operate a system for collecting discarded products and maintaining in-use products. However, if a specialized contractor who is designated maintains the system and delivers substantial performance, this shall be also considered as having met the criteria.

3.1.4.2

'Construction and Maintenance Guidelines' [example: "Attachment D" of "KS M 3888-1 (School Athletic Facilities – Artificial Turf) shall be kept as a manual, and shall be provided to the installer in order to comply with the requirements of the guidelines. For the installation process, the guide shall include the statement "If adhesives used in the products are not E-mark certified as 'Adhesive (EL251),' one of the target product certification criteria, the requirements specified in the '3.1.1 Environmental Criteria' of EL251 must be satisfied."

3.2 Quality

3.2.1

The product shall meet the quality or performance criteria of KS M 3888-1 (school athletic facilities - artificial turf).

3.2.2

Infill, if used, shall meet the following criteria.

3.2.2.1

The particle size and weight of infill shall be as follows:

item	criteria
particle size	Particles smaller than 0.5 mm in size shall be less than 1% by weight.
weight	1.1 ~ 1.5

Note: This criteria does not apply to natural materials such as cork.

3.2.2.2

The acetone extract, ash, water, iron, and fiber parts of waste rubber powder infill shall meet the rubber powder performance criteria of GR M 6024(rubber powder for artificial turf).

3.3 Information for Consumers

(a) Information on the product's contribution to reduction of the environmental impacts during the product usage, such as grounds of certification for the product (reduced hazardous material), shall be provided in the catalog.

(b) Information on necessity of continuous maintenance and any relevant methods after construction on site shall be provided.

(c) For artificial grass mat, the length of turf pile (use mm as the unit of length) and intended use of product (for sports, leisure, landscape, etc.)

4. Test Method

certification criteria			Test and verification methods
3.1	3.1.1	3.1.1.1	a) ~ c) Verification of submitted document
			d) Test report issued by an accredited testing laboratory in accordance with KS M 1991 (Determination of phthalates content in plastic materials)
			e) ~ f) Verification of submitted document
		3.1.1.2	Test report issued by an accredited testing laboratory in accordance with KS M 0031 (General Rules for Gas Chromatography Analysis)
		3.1.1.3	Verification of submitted documents or test report issued by an accredited testing laboratory in accordance with "3.1 Environmental Criteria" in "Adhesives (EL251)"
	3.1.2	3.1.2.1 ~ 3.1.2.3	Test report issued by an accredited testing laboratory in accordance with KS M 6956 (Test Method for Estimating Toxicity of Recycled Rubber Powder) ^{Note 1)}
		3.1.3	Test report issued by an accredited testing laboratory in accordance with ion of extractable heavy metals in textiles laboratory in "Testing laboratory in accordance with "ES0615" ^{Note 2)}
	3.1.4	Review of submitted documents and on-site inspection	
3.2		3.2.1	Test report by the relevant accredited testing laboratory in accordance with the relevant standards, or certificate of equivalent standards or higher.
	3.2.2	3.2.2.1	① Particle size: Test report issued by an accredited testing laboratory in accordance with KS M 0064 (Test methods for sieving of chemical products) ② Weight: Test report issued by an accredited testing laboratory in accordance with KS M 6519 (Analysis method for rubber goods)
		3.2.2.2	Test report by the relevant accredited testing laboratory in accordance with g GR M 6024 (Rubber powder for artificial turf), or a certificate of equivalent or higher standards
Consumer Information			Verification of submitted document

Note 1) Contents of zinc (Zn) shall be analyzed in accordance with the method specified in "KS M 0032 (General Rules for ICP Emission Spectrochemical Analysis)".

Note 2) The turf pile shall be cut to the length of 1 cm in the longer side regardless of the thickness, woven fabric shall be cut to the size of (1x1) cm and shock absorption pad shall be cut to the size of (1x1x1) cm for testing, while the size of infill shall remain unchanged.

4.1 General

4.1.1

Number of test sample shall be 1 for each submitted product, except when more than 1 sample is needed.

4.1.2

Test samples shall be randomly selected from products that are on markets or stored in production sites by the eco label certification body.

4.1.3

Test results shall be rounded according to KS Q 5002 (Statistical interpretation of data - Part 1 : Statistical presentation of data)

4.2 Test method for leaching the hazardous materials from infill

4.2.1

Extraction method

4.2.1.1

First extraction

- i. Put 50g of sample into a triangular flask. Add 500mL of deionized water to the flask.
- ii. Place the flask on a magnetic stirrer, and connect carbon dioxide (CO₂) gas.
- iii. Inject CO₂ gas (50mL/min) to the flask for 24 hours and commence the first extraction.
- iv. Filter the first extract and store.

4.2.1.2

Second extraction

- i. The first extract is again extracted by using the second extraction media (500mL of deionized water or dilute hydrochloric acid) under the same conditions as the first extraction or conditions which follow the Korean Standard Test Methods for Wastes.
- ii. Filter the second extract. Analyze the filtrate for heavy metals and store the remaining filtrate.
- iii. Mix the first and the second extracts in 1:1 portions. Analyze the mixture for heavy metals.

4.2.2

Analysis method: Conduct instrumental analysis using ICP and other appropriate devices.

5. Grounds for Certification

"Reduction of hazardous materials", "Reuse of available resources (for only applicable products)"

<Attachment> List of chemicals (for 'C-(1)-(a)')

1. Allergic disperse dyes

CAS No.	Substance	CAS No.	Substance
2475-45-8	C.I. Disperse Blue 1	12223-33-5	C.I. Disperse Orange 37
2475-46-9	C.I. Disperse Blue 3	13301-61-6	C.I. Disperse Orange 76
3179-90-6	C.I. Disperse Blue 7	2872-52-8	C.I. Disperse Red 1
3860-63-7	C.I. Disperse Blue 26	2872-48-2	C.I. Disperse Red 11
12222-75-2	C.I. Disperse Blue 35	3179-89-3	C.I. Disperse Red 17
12222-97-8	C.I. Disperse Blue 102	119-15-3	C.I. Disperse Yellow 1
12223-01-7	C.I. Disperse Blue 106	2832-40-8	C.I. Disperse Yellow 3
61951-51-7	C.I. Disperse Blue 124	6373-73-5	C.I. Disperse Yellow 9
23355-64-8	C.I. Disperse Brown 1	12236-29-2	C.I. Disperse Yellow 39
2581-69-3	C.I. Disperse Orange 1	54824-37-2	C.I. Disperse Yellow 49
730-40-5	C.I. Disperse Orange 3		

2. Carcinogenic dyes

CAS No.	Substance	CAS No.	Substance
3761-53-3	C.I. Acid Red 26	573-58-0	C.I. Direct Red 28
569-61-9	C.I. Basic Red 9	2475-45-8	C.I. Disperse Blue
632-99-5	C.I. Basic Violet 14	82-28-0	C.I. Disperse Orange 11
1937-37-7	C.I. Direct Black 38	2832-40-8	C.I. Disperse Yellow 3
2602-46-2	C.I. Direct Blue 6		

3. Flame retardants

CAS No.	Substance	CAS No.	Substance
59536-65-1	PBBs: polybrominated biphenyles	25637-99-4	HBCDD: hexabromocyclododecane
126-72-7	TRIS: tri-(2,3-dibromopropyl)- phosphate	85535-84-8	short chain chlorinated paraffins (C10 ~ C13)
545-55-1	TEPA: tris-(aziridiny)-	115-96-8	TCEP:tris(2-chloroethyl)- phosphate

	phosphinooxide)		
32534-81-9 32536-52-0 1163-19-5	PBDEs: polybromodiphenyl ethers	79-94-7	TBBPA: tetrabromobisphenol-A

4. Phthalates

CAS No.	Substance	CAS No.	Substance
28553-12-0 68515-48-0	DINP: di-iso-nonylphthalate	85-68-7	BBP: butyl benzylphthalate
117-84-0	DNOP: di-n-octyl	84-74-2	DBP : di-butylphthalate
117-81-7	DEHP: di-(2-ethylhexyl) phthalate	84-69-5	DIBP: di-iso-butylphthalate
26761-40-0 68515-49-1	DIDP: di-iso-decylphthalate		

5. Chlorinated benzene, Chlorinated toluene

CAS No.	Substance	CAS No.	Substance
-	dichlorobenzenes	-	chlorotoluenes
-	trichlorobenzenes	-	dichlorotoluenes
-	tetrachlorobenzenes	-	trichlorotoluenes
-	pentachlorobenzenes	-	tetrachlorotoluenes
-	hexachlorobenzenes	-	pentachlorotoluenes