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Ceramic tiling systems — Sustainability for ceramic tiles and installation materials —

Part 1:
Specification for ceramic tiles

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Contents

Foreword

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 189, *Ceramic Tiles*.

Introduction

This voluntary sustainability Standard outlines the requirements for sustainable tiles and installation materials including environmental, economic and social criteria, in order to:

promote the development and use of sustainable ceramic tiles and installation materials

guide all stakeholders in environmental responsibility throughout the supply chain for tiles and installation materials;

provide a verifiable resource for tile product specification and for design professionals, contractors and consumers to identify sustainable tiles and installation materials;

increase the value of sustainable tiles and installation materials throughout the supply chain by creating greater market awareness and demand.

This Standard provides a system for sustainability assessment of products throughout their life cycle using qualitative and quantitative indicators for environmental performance and for social and economic responsibility pertaining to the design, manufacture, installation, and use of ceramic tiling systems. This Part 1 is focused on ceramic tiles, as part of the tiling system.

This Standard can be used to assess the sustainability performance of the product of interest.

Evaluation schemes, taking into account the materials mentioned in the product standards, to enable comparability of the results of assessment, are part of this standard.

This assessment may be used to support certification schemes for buildings in fulfilling sustainability criteria.

Ceramic tiling systems — Sustainability for ceramic tiles and installation materials —

Part 1:
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1 Scope

This standard specifies sustainability requirements together with assessment methods and evaluation schemes for ceramic tiles and installation materials.

This standard includes relevant criteria across product life cycle from raw material through manufacturing, use, and end-of-life management.

This standard applies to ceramic tile installation materials including: ceramic tiles, adhesives, grouts, membranes, etc. This Part 1 deals with ceramic tiles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- ISO 13006, Ceramic tiles—Definitions, classification, characteristics and marking

- ISO 14024, Environmental labels and declarations — Type I environmental labelling — Principles and procedures

- ISO 14025, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

- ISO 21930, Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply

3.1 Sustainability

3.1.1 environmental sustainability

state in which the ecosystem and its functions are maintained for the present and future generation

3.1.2 economic sustainability

ability to provide sustainable, successful places in an economic context. (Economic considerations include employment, competitiveness, wealth and distribution, welfare, accounting and regulation)

3.1.3 social sustainability

ability to provide sustainable, successful places in a social context. Combines design of the physical realm with design of the world, infrastructure to support social and cultural life, provides social amenities, systems for citizen engagement and spaces for people and places to evolve

3.1.4 Life Cycle Assessment (LCA)

systematic evaluation of the environmental impact of a product(s) that includes all stages of its life cycle

[SOURCE:ISO 14040:2006]

3.1.5 Life time

consecutive and interlinked stages of the products under consideration (e. g. period from installation to uninstalling)

3.2 Environment

3.2.1 environment

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

[SOURCE: ISO 14001:2015]

Note 1 to entry: surroundings in this context extend from within an organization to the global system

3.2.2 environmental aspect

element of an organization's activities or products or services that can interact with the environment

[SOURCE: ISO 14001:2015]

3.2.3 environmental impact

any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects.

[SOURCE: ISO 14001:2015]

3.3 Materials input

3.3.1 raw material

basic material that can be converted by processing or manufacturing, or a combination of both, into a new product.

Note 1 to entry: A raw material may be virgin, recycled, harvested, extracted, recovered, or manufactured when used as an ingredient in a new material.

3.3.2 indigenous raw materials

Raw materials that are recovered, harvested, or extracted within a *800 km* radius of the manufacturing site

Note 1 to entry: Where materials are transported by water or rail, the distance to the manufacturing site shall be determined by multiplying the distance that the materials are transported by water or rail by 0,25 and adding that number to the distance transported by means other than water or rail

3.3.3 fresh water

surface water and groundwater withdrawn for manufacturing use

3.3.4 water saving

reduction in water use accomplished by implementation of water conservation, water reduction and/or water efficiency measures

3.3.5 packaging material

any material intended for presentation to a consumer that is used for the containment, protection, handling, or preservation of a product

Note 1 to entry: Included tools in a kit or parts of the packaging that are used directly in the combining or installation of the product shall be excluded from this definition

Note 2 to entry: Shipping material is not considered to be packaging material.

3.3.6 primary packaging

any material that first envelops and holds the product of interest. It's intended to be the smallest unit of distribution or use and is the package which is in direct contact with the contents. For ceramic tiled the primary packaging is restricted to the following materials: paper, cardboard or corrugate

3.3.7 shipping material

Any material that is used for the containment, protection, handling, or preservation of a product while en route from one location to another that is generally not intended for presentation to a consumer. For example, pallet, industrial carton, banding, freight panels, wood/lumber bracing, etc.

3.4 Sustainability management

3.4.1 energy management (EEMS)

energy efficiency management system

procedures to monitor, control, evaluate and improve the performance of the used energy

[SOURCE: ISO 50001:2011]

3.4.2 environmental management (EMS)

environmental management system

procedures to monitor, control, evaluate and improve the organization environmental performance

[SOURCE: ISO 14001:2015]

3.4.3 health and safety management (OHSMS)

occupational health and safety management system

procedures to monitor, control, evaluate and improve the system performance as regards health and safety

[SOURCE: OHSAS 18001:2007]

3.4.4 environmental product declaration (EPD)

standardized and LCA based tool – type III environmental declaration - to communicate the environmental performance of a product or system

[SOURCE: ISO 14025:2006)

3.4.5 type I environmental label

LCA based label which identifies products or services proven environmentally preferable overall, within a specific product or service category

[SOURCE. ISO 14024:2001]

3.4.6 certified

the product or the management system is certified by a certification body in accordance with the relevant standard

3.4.7 certification body

third-party conformity assessment body operating certification schemes

3.4.8 maintenance / service

actions which have the objective of retaining or restoring a product in or to a state in which it can perform its intended function.

3.5 Products and production

3.5.1 ceramic tile

ceramic surfacing unit, usually relatively thin in relation to facial area, having either a glazed or unglazed face and fired above red heat in the course of manufacture to a temperature sufficiently high to produce specific physical properties and characteristic

[SOURCE: ISO 13006:2012]

3.5.2 product of interest

single product or line of products with homogeneous technical characteristics and equal environmental impacts and performances

Note 1 to entry: in case of product specific environmental criteria a “worst case scenario” analysis of a single product may suffice to extend the boundaries of the product of interest to be representative of the facility’s entire production

3.5.3 production

industrial processes involving steps resulting in the manufacture of products or items

3.5.4 transport

Movement of goods (e. g. products, raw materials) from one location to another

3.6 Waste materials

3.6.1 post-consumer material

Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its original intended purpose

[SOURCE: ISO 14021:2016]

3.6.2 pre-consumer material

material, solid and/or liquid, diverted from a waste stream generated by the manufacturing process

Note 1 to entry: Reutilization of materials (i.e. rework, regrind or scrap generated in a process that does not enter the waste stream and that is capable of being reclaimed within the same process that generated it) is excluded

[SOURCE: ISO 14021:2016]

3.6.3 reclaimed waste

waste, scrap material, or water generated during manufacturing processes that, in lieu of disposal, is captured and reused to manufacture more of the same product.

3.6.4 production wastewater

liquid waste resulting from industrial processes, including but not necessarily limited to water mixed with raw materials, contact cooling water, condensing waters, and water that comes in contact with process materials, products or byproduct, but excluding sanitary sewage, cafeterias, irrigation, storm water runoff.

3.6.5 wastewater discharged

production wastewater generated in the manufacturing process, that is discharged in the external environment (for example, to publicly owned treatment works (POTW)).

3.6.6 waste management / recycling

collection, transport, processing, recycling or disposal, and monitoring of waste materials.

3.7 Health and safety

3.7.1 hazard

Source, situation, or act with a potential for harm in terms of human injury or ill health, or a combination of these.

[SOURCE: OHSAS 18001:2007]

3.7.2 hazard identification

Process of recognizing that a hazard exists and defining its characteristics.

[SOURCE: OHSAS 18001:2007]

3.7.3 ill health

Identifiable, adverse physical or mental condition arising from and/or made worse by a work activity and/or work-related situation. See definition 3.11 of this document.

[SOURCE: OHSAS 18001:2007]

3.7.4 safety in use

level of risks associated with the installation and use of the products.

3.7.5 sanitary employers surveillance

surveillance program including generic or specific medical check-up, according to risk assessment

3.8 Symbols and acronyms

For the purposes of this document, the following symbols and acronyms are used:

EF_j

(g/m^2 or g/kg)

emission factor of the pollutant "j" (PM, HF) through emissions into the atmosphere

EEMS

energy efficiency management system

EMAS

eco management and auditing scheme

(Note 1 to entry: European Commission Reg. 1221/2009)

EMS

environmental management system

EPD

environmental product declaration

FC

($TJ/year$ or $Sm^3/year$)

Fuel consumption (annual)

FW

(L/m^2 or L/t)

specific fresh water consumption

HF

hydrogen fluoride

I

(%)

quantity of indigenous raw materials in the body of the product of interest

ILO

international labor organization

LPgas

liquefied petroleum gas

M

mandatory requirements

NCV

net calorific value

Nm³

cubic meter of gas measured in Normal conditions (T = 273 K, p = 101.3 kPa)

OHSMS

occupational heath and safety management system

PM

particulate matter

POTW

publicly owned treatment works for wastewater

PPE

personal protective equipment

RC

(%)

recycled and/or reclaimed waste content in the body of the product of interest

RCS

respirable crystalline silica

RMC

(%)

recycled material content in packaging material

RF

(%)

process waste recycle/reuse factor

SDS

safety data sheet

SFCF

(adimensional)

normalized Specific Fuel Consumption Factor

Sm^3

Cubic meter of gas measured in Standard conditions (T = 298 K, p = 101.3 kPa)

SR

(%)

sustainability rating

SR_{ref}

(%)

reference sustainability rating

V1

Voluntary pass-fail requirements

V2

Voluntary multirating managerial requirements

V3

Voluntary multirating quantitative & performance requirements

VOC

volatile organic compounds

WD

(%)

Wastewater discharge

4 Principle criteria for sustainable products

4.1 General

The criteria are based on the "three pillar model" of sustainability: environmental, economic and social sustainability, as stipulated in the World Summit Conference 2005.

Environmental, Economic, and Social sustainability criteria are detailed in Table 1 (1.1, 1.2 and 1.3, respectively) which reports the requirements to be used for the sustainability assessment according to this standard.

Two categories of requirements are adopted:

Mandatory requirements: PASS/FAIL requirements, whose compliance is a pre-requisite for a product assessed as sustainable. No rating is acknowledged for products compliant with mandatory requirements. If a product isn't compliant with all mandatory requirements cannot be classified as sustainable.

Multirating, Voluntary requirements: requirements which a product can comply with at different levels, awarded through a different rating. The compliance level to multirating requirements contributes to the final rating of the product, as specified in § 6 of this standard.

The requirements are listed in annex 7.1 Tables 1.1, 1.2 and 1.3 are marked with the same numbers used in the successive § 5, and are classified according to the type:

M = Mandatory requirement

V1 = Voluntary Pass/Fail requirements

V2 = Voluntary multirating managerial requirements

V3 = Voluntary multirating quantitative & performance requirements

Reference to this classification of sustainability requirements will be made in § 6.

4.2 Environmental criteria

The environmental criteria are (see annex 7.1 Table 1.1):

- Raw materials
- Manufacture
- Distribution and installation
- Use
- End of life
- Product environmental mark/labelling

4.3 Economic and functional criteria

The economic and functional criteria are (see annex 7.1 Table 1.2)

Product quality, performance level, fitness for use