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ecoASA SPECIFICATION FOR PRESSED EARTH BLOCKS

DRAFT

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Specification Change History

Date	Version	Change
2023/11/09	V 0.1	Draft Specification version 0.1
2023/11/11	V 0.2	Clean-up of grammatical and specification errors
		Demonstration of conformance added

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ecoASA Specification for Pressed Earth Blocks

BACKGROUND

The Public Works Green Building Policy (2018) supports the principles of sustainable development that government is bound to by the Constitution, and aims to provide leadership in the sustainable building sector through efficient energy, water and waste management, indoor environmental quality and comfort, and ensuring sustainable product and materials management.

Arising from the Public Works Green Building Policy, the National Department of Public Works and Infrastructure (NDPW&I) undertook to initiate the development of a South African eco-labelling system, whereby building materials and products related to the construction industry and the property sector would be rated in terms of their environmental impact. The objective of an eco-label is to provide accurate and honest information on environmental aspects of products in order to encourage demand and supply of products that are less stressful on the environment (SANS 14020, 2003).

Agrément SA, a Schedule 3A entity established under the Agrément South Africa Act 11 of 2015, is mandated to assure non-standardised construction products are fit for purpose. Agrément SA is an impartial and internationally acknowledged South Africa centre for assessment and certification. Agrément SA was selected as the competent body to establish the eco-labellingsystem, which has become known as the ecoASA labelling system.

The ecoASA label conforms to ISO 14020:2022 Environmental labels and declarations – General principles and to ISO 14024:1999 Environmental labels and declarations – Type I environmental labelling – Principles and procedures. ISO14024 requires environmental labelling specifications to include criteria that are objective, attainable and verifiable. It requires that interested parties have an opportunity to participate and have their comments considered. It also requires that environmental criteria be set, based on an evaluation of the environmental impacts during the actual product or service life cycle, to differentiate product and services on the basis of preferable environmental performance.

INTRODUCTION

(Acknowledgements: This introduction draws on, amongst others: Rammed earth: Design and construction guidelines, by Peter Walker, Rowland Keable, Joe Martin Vasilios Maniatidis (2005). Published by BRE Bookshop; and The Australian Earth Building Handbook, by Dr Peter Walker and Standards Australia)

Unlike sundried mud bricks, pressed (or compressed) earth blocks are a relatively recent innovation in earth construction. Since the early 1930s, a large variety of both manual and mechanized block presses have been developed, and compaction and stabilization have greatly improved unit strength and durability. Stabilized pressed earth blocks are increasingly being used for both load-bearing and non-load-bearing applications.

Pressed earth construction is usually regarded as esthetically pleasing, environmentally friendly. As a natural material, without or with limited processed additives, Pressed earth can have significantly lower embodied carbon dioxide and energy than conventional manufactured building materials, as well as reduced toxic chemical content and fewer emissions from industrial processes. This technique can produce buildings that are strong, durable, safe and desirable.

The main environmental impacts of pressed earth blocks stem from transportation of heavy materials. Using in-situ sourced materials is the ideal but is entirely dependent on the material's suitability. Pressed earth blocks use the subsoil layer, and it is imperative that the organic rich topsoil is recovered and reused.

Soil stabilizers, additives, dyes and coatings are often used with pressed earth block construction. In general, these are not hazardous, but care must be taken to ensure that such substances are not harmful to humans and to the environment.

Pressed earth blocks are susceptible to decay in the presence of water. This requires special consideration in design and construction and throughout its service life. New walls in particular should be protected from inclement weather to prevent premature damage. Generally the level of maintenance required for pressed earth blocks will be higher than that of some competing materials.

Pressed earth blocks derive much of their physical resistance from the material's relatively high density, but a consequence of this is its poor thermal resistance. However, in South African conditions a normal uninsulated 200 mm wall is normally more than adequate to meet the thermal performance levels expected of modern energy efficient buildings and to meet requirements of the National Building Regulations.

Pressed earth construction is not covered by the deemed-to-satisfy rules of the NBRs, and would therefore require a 'rational design' by a competent person or an Agrément Certificate. This ecoASA Specification for has adopted the more general used approach of requirements for an Agrément Certificate.

This ecoASA Specification aims to address the issues highlighted above and to produce environmental benefits by encouraging more sustainable production of raw materials, reducing the use of hazardous substances and their associated discharges and prolonging the useful life of the products and their component parts.

As information and technology change, product category requirements will be reviewed, updated and possibly amended.

APPLICATION AND EVALUATION

Manufacturers or service suppliers interested in Agrement SA certification an ecoASA specification are encouraged to read carefully through the entire specification and to evaluate whether their products are likely to conform to the specification and to pass the assessment process.

The product will be evaluated by an independent auditing body appointed by Agrement SA. The audit is done against the criteria specified in the ecoASA Specification. Conformance with each relevant criterion is verified by the auditing body with the aid of supporting documentation including test results where necessary. On-site verification may also be required in addition to documentation to verify conformance, and the applicant must allow the auditor access to the site for this purpose (upon arrangement).

Where the product meets the requirements of the ecoASA Specification, a certificate of conformance will be issued by the auditing body that the product complies to the ecoASA Specification. Agrement SA will then issue a licence for use of the label. Then the product may be called 'ecoASA Certified'.

OVERVIEW OF REQUIREMENTS

An overview of the requirements for conformance to this ecoASA Specification is given in Appendix A. Compliance with the ecoASA Specification and the use of the ecoASA license requires a signed declaration by the applicant, together with supporting documentation. The table in Appendix A can simply be signed by the applicant.

DEFINITIONS AND ACRONYMS

Acronyms

DoC:	Demonstration of Conformance.
EMP:	Environmental Management Plan.
SANS:	South African National Standard, published by the South African Bureau of Standards.

Definitions

Applicant:	A supplier of products or services seeking Certification for its goods or services to an ecoASA Specification.
Auditor:	An auditor is responsible for determining conformance or alternatively, non-conformance of a product to each criterion within an ecoASA Specification. Auditors must follow the guidelines in these ecoASA Scheme Rules, and perform an audit as defined in ISO IEC 17065.
Carcinogenic:	Substances capable of causing cancer.
CAS number:	The number that uniquely identifies a chemical, given in accordance with the nomenclature systems of the International Union of Pure and Applied Chemistry or the Chemical Abstracts Service (CAS).
Chemical agent:	A GHS-aligned chemical element or compound.
Certified:	A product is considered certified after it has successfully been shown to meet the specified requirements of an ecoASA Specification, a Certificate of Conformance has been issued by a Conformity Assessment Body for the Applicant to a Specification, and Agrément South Africa has issued a License for use of the Label. The product may then be called 'ecoASA Certified'.
Certificate of Conformance:	Certification issued by Agrément South Africa that a product complies to an ecoASA Specification.
ecoASA label:	The Agrément South Africa ecolabel.
Ecotoxic:	Harmful to animals, plants, or the environment.
HAZ Code:	A unique alphanumerical code that consists of one letter and three numbers to denote a hazard statements.
Hazard category:	A division of criteria within each hazard class, for example, oral acute toxicity includes five hazard categories and flammable liquids includes four hazard categories.
Hazard class:	The nature of the physical, health or environmental hazard, for example flammable liquid, carcinogenicity or oral acute toxicity.
Hazard statement:	The statement assigned to a hazard class and category that describes the nature of the hazards of a hazardous product, including, where appropriate, the degree of hazard.
Label:	The ecoASA label.
License:	The License allows the Licence Holder to display the ecoASA Label.
License Holder:	A supplier of products or services that has successfully applied for and been awarded a Licence for the use of the ecoASA Label.
Product:	The term 'product' is used in an ecoASA Specification in its widest sense to include goods, services and processes.
Product Category:	A group of products which have equivalent function. <i>* Adapted from ISO 14024 ISO 14024; Environmental Labels and Declarations: Environmental Labeling Type I, Guiding Principles and Procedures.</i>

1. PRODUCT SCOPE

Criterion 1.1: The applicant must verify that the product falls within the product scope of this Specification. This Specification is applicable to stabilized and unstabilized pressed earth blocks, which can be manufactured on site or in a manufacturing yard and transported to site.

An ecoASA certificate is awarded based on the applicant by demonstrating compliance with this Specification. The following are excluded from this Specification:

- a) Adobe construction; an air-dried brick made from a puddled earth mix cast in a mould and which contains a mixture of clay, sand and silt.
- b) The addition of lightweight materials such as vermiculite, pumice, natural fibres, polystyrene waste and cork to the block.

Demonstration of Conformance

DoC 1.1: A description of the scope of certification that the applicant is applying for, together with supporting documentation.

2. FITNESS FOR PURPOSE

To be certified, the rammed earth construction must be fit to perform its intended purpose or application. A minimum level of quality and durability is implicit before the ecoASA ecolabel can be displayed on the product. The applicant must ensure that the finished rammed earth construction product is fit for its intended purpose.

Criterion 2.1: The pressed earth block must be certified by Agrément SA as fit for purpose.

Demonstration of Conformance

DoC 2.1: Agrément SA Certificate reference number.

3. HAZARDOUS AND PROHIBITED SUBSTANCES

The criteria in this section are intended to address the main hazardous substances used during construction (including transport and storage). The intention is to reduce the use of hazardous materials and to prevent pollutants entering the environment.

Pressed earth brick construction is normally a component of a building or construction project. To enhance the positive impact of pressed earth block construction in encouraging less stressful on the environment, the manufacturer of the pressed earth block must impose requirements for the use of the pressed earth brick on the larger building or construction process. The criteria below apply to requirements for the use of the pressed earth brick to be certified to the ecoASA label for pressed earth bricks.

The following criteria apply to both the case of whether the pressed earth block is manufactured on-site or off-site.

Criterion 3.1: Substances which are classifiable as toxic, respiratory or skin sensitisers, or carcinogenic, mutagenic or toxic for reproduction according to the South African Regulations for Hazardous Chemical Agents (HCAs) given in the table below must not be used as additives, stabilizers, surface treatments or at any stage of the manufacturing of the product:

Classification of Hazardous Agents (Regulation for Hazardous Chemical Agents; OH&S Act)		
Danger: Fatal if swallowed	H300	
Danger: Toxic if swallowed	H301	
Danger: Fatal in contact with skin	H310	
Danger: Toxic in contact with skin	H311	
Danger: Fatal if inhaled	H330	
Danger: Toxic if inhaled	H331	
Danger: Causes severe skin burns and eye damage	H314	
Danger: Causes serious eye damage	H318	
Danger: May cause allergy or asthma symptoms or breathing difficulties if inhaled	H334	
Danger: May cause genetic defects	H340	
Warning: Suspected of causing genetic defects	H341	
Danger: May cause cancer	H350	
Warning: Suspected of causing cancer	H351	
Danger: May damage fertility or the unborn child	H360	
Warning: Suspected of damaging fertility or unborn child	H361	
Danger: Causes damages to organs	H370	
Warning: May cause damage to organs	H371	
Danger: Causes damages to organs through prolonged or repeated exposure	H372	
Warning: May cause damage to organs through prolonged or repeated exposure	H373	
Danger: May be fatal if swallowed and enters airways	H304	
Warning: May be harmful if swallowed and enters airways	H305	
Warning: Harmful if swallowed	H302	
Warning: Harmful in contact with skin	H312	
Warning: Harmful if inhaled	H332	
Warning: Causes skin irritation	H315	
Warning: May cause an allergic skin reaction	H317	
Warning: Causes serious eye irritation	H319	
Warning: May cause respiratory irritation	H335	
Warning: May cause drowsiness or dizziness	H336	
Warning: Harms public health and the environment by destroying ozone in the upper atmosphere	H420	
Warning: Very Toxic to aquatic life	H400	
Warning: Very Toxic to aquatic life with long lasting effects	H410	
Toxic to aquatic life with long lasting effects	H411	
May cause harm to breast-fed children	H362	na

Demonstration of Conformance

DoC 3.1: A signed declaration from the applicant stating that HCAs are not used as additives, stabilizers, surface treatments or at any stage in the manufacturing of the product.

Criterion 3.2: The sale or use of the product must include recommendations that any flashing material at the base of an earth wall should not consist of lead sheeting or zinc-coated steel.

** Agrément SA has issued a Certificate for a bitumen coating that can be used for this.*

Demonstration of Conformance

DoC 3.2: A signed declaration from the applicant stating that the sale or use of the product includes instructions that flashing material at the base of a rammed earth wall should not consist of lead sheeting or zinc-coated steel, together with supporting documentation.

Criterion 3.3: The sales or use of the product must include recommendations that any paint used on the pressed earth blocks should be:

- lead free or contain more not than 90 parts per million of lead;
- marketed and/or labelled as APEO free when used on internal surfaces;
- marketed and/or labelled as low VOC when used on internal surfaces.

Demonstration of Conformance

DoC 3.3: A signed declaration from the applicant stating that the sale or use of the product includes instructions no or low lead, APEO free and low VOC paint to be used as external or internal coatings, together with supporting with the documentation.

4. RESPONSIBLE PRODUCTION

Responsible production (or construction) encourages the use of sustainable materials, the use and reuse of materials, minimising the impacts of the construction on the environment.

4.1 Soil

Criteria 4.1: The soil that is used to produce the product is quarried:

- a) from legal sources;
- b) within a distance of not more than 200 km from the manufacturing site; and
- c) the topsoil is stockpiled for reuse or disposed of as per the owner of the soil quarry.

Demonstration of Conformance

DoC 4.1: A signed declaration from the applicant stating that the soil used to produce the product meets the requirements of this criterion for sourcing of the soil, together with supporting with the documentation.

Criteria 4.2: Where the product is manufactured on-site, the topsoil must be stockpiled for reuse on or off the site.

Demonstration of Conformance

DoC 4.2: A signed declaration from the applicant stating that where the product is manufactured on-site, the topsoil is stockpiled for reuse on or off the site, together with supporting with the documentation.

4.2 Production and Transport Equipment

Criteria 4.3: Operating equipment

Where motorised equipment is used (such as petrol, diesel, electric) for the transportation and/or manufacturing of the product, all operating equipment must be maintained at the intervals recommended by the manufacturer of the equipment.

Demonstration of Conformance

DoC 4.3: A signed declaration from the applicant stating that operating equipment is maintained at the intervals recommended by the manufacturer of the equipment, together with supporting with the documentation.

4.3 Air, Water and Waste Management

Criterion 4.4: The applicant must have an Environmental Management Plan (EMP) for air, water and waste management for the production of the product, covering as a minimum:

- a) air pollution from petrol and diesel equipment;
- b) dust pollution;
- c) recycling or disposal of motor oil by a licensed waste contractor; and
- d) treatment and/or disposal of polluted water.

The environmental management plan must specify how the effectiveness of environmental management measures will be monitored, and it should also include trigger values or conditions under which corrective actions are to be taken.

** This criterion relates to the production facility as a whole and is not measured with reference to the specific product.*

Demonstration of Conformance

DoC 4.4: A signed declaration from the applicant stating that actioned EMPs are in place that conform to the requirements of this criterion, together with supporting documentation.

5. MAINTENANCE AND REPAIR

Enhancing the life of a product is key to enhancing sustainability.

Criterion 5.1: The applicant must compile a maintenance and repair manual for the pressed earth block, which must be made available to the client or end user.

Demonstration of Conformance

DoC 5.1: A signed declaration from the applicant stating that a maintenance and repair manual for the product is made available to the client or end user, together with supporting documentation.

6. LEGAL COMPLIANCE

Criterion 6.1: As a minimum, the applicant is responsible that the manufacture of the product complies with all relevant environmental legislation at the local authority, provincial and national levels. This may include, but is not limited to:

- a) Occupational Health and Safety Act No. 85 of 1993;
 - Lead Regulations, 2001
 - Regulations for Hazardous Chemical Agents, 2021
- b) National Environmental Management: Waste Act No. 59 of 2008;
 - Waste Classification and Management Regulations.
- c) Mineral and Petroleum Resources Development Act No. 28 of 2002;
- d) National Environmental Management Act No. 107 of 1998 .
- e) National Environmental Management: Air Quality Act No. 39 of 2004 (NEM:AQA).
- f) National Environmental Management: Protected Areas Act No. 57 of 2003.
- g) National Water Act No. 36 of 1998 (NWA);
 - South African Water Quality Guidelines.
- h) Environment Conservation Act No. 73, 1989

Demonstration of Conformance

DoC 6.1: If the applicant is guilty of a breach of an environmental law within the preceding two years, the applicant must provide evidence of corrective action, together with supporting documentation.

APPENDIX A. DEMONSTRATION OF CONFORMANCE

Product description including model name/number:				
Section	Criterion	Demonstration of Conformance	Supporting information	Signature of Declarant
1. Product Scope				
	1.1	Description of the scope of certification that the applicant is applying for, together with supporting documentation	Attached: Y / N	
2. Fitness for Purpose				
	2.1	Agrément SA Certificate reference number	Attached: Y / N	
3. Hazardous and Prohibited Substances				
	3.1	Declaration stating that HCAs are not used as additives, stabilizers, surface treatments or at any stage in the manufacturing of the product	Attached: Y / N	
	3.2	Declaration stating that the sale or use of the product contains instructions that flashing material at the base of a rammed earth wall should not consist of lead sheeting or zinc-coated steel, together with supporting documentation	Attached: Y / N	
	3.3	Declaration stating that the sale or use of the product includes instructions for no or low lead, APEO free and low VOC paint to be used as external or internal coatings, together with supporting with the documentation	Attached: Y / N	
4. Responsible Production				
4.1 Soil	4.1	Declaration stating that the soil used to produce the product meets the requirements of this criterion for sourcing of the soil, together with supporting with the documentation	Attached: Y / N	
	4.2	Declaration stating that where the product is manufactured on-site, the topsoil is stockpiled for reuse on or off the site, together with supporting with the documentation	Attached: Y / N	
4.2 Production and Transport Equipment	4.3	Declaration stating that operating equipment is maintained at the intervals recommended by the manufacturer of the equipment, together with supporting with the documentation	Attached: Y / N	
4.3 Air, Water and Waste Management	4.4	Declaration stating that actioned EMPs are in place that conform to the requirements of this criterion, together with supporting documentation.	Attached: Y / N	
5. Maintenance and Repair				
	5.1	Declaration stating that a maintenance and repair manual for the product is made available to the client or end user, together with supporting documentation.	Attached: Y / N	

Product description including model name/number:				
Section	Criterion	Demonstration of Conformance	Supporting information	Signature of Declarant
6. Legal Compliance				
	6.1	If the applicant is guilty of a breach of an environmental law within the preceding two years, the applicant must provide evidence of corrective action, together with supporting documentation	Attached: Y / N	