ACERMI & INSULATION PROFESSIONALS

Issue 6 of the Association pour la CERtification des Matériaux Isolants newsletter – **DECEMBER 2016**

The course of a certified insulation product

To be certified, the performances of an insulation product must be tested and verified. From production plant sampling through to writing the test report, each insulation product passes through a series of tests to assess its performance and its durability.

ACERMI certification is based on validating the performance claims made by product manufacturers. This is particularly true for thermal resistance R-value which is central to the certification process.

This validationis carried out in the laboratories of the "Centre Scientifique et Technique du Bâtiment" (CSTB) and the "Laboratoire National de Métrologie et d'Essais" (LNE). Here, insulation products follow a clearly defined test course according to their type, the standards they must meet, and performances type to be validated. Each laboratory is animated by a team of specialists. Specimen identification, conditioning, preparation, testing and report writing is shared equally between the CSTB and LNE teams. The CSTB team animated by a laboratory manager, include eight technicians and one assistant . Audits are conducted by three auditors. At the LNE, a dozen specialist insulation technicians carry out production plant audits and specimen testing.

Both laboratories are accredited by the French accreditation body COFRAC, which validates correct test procedures in the CSTB and LNE laboratories, the manufacturer production plant audits and the certification management system. The audits conducted by COFRAC supplement the internal quality management, exchange of information and regular comparison procedures of the two laboratories to verify continuity of result consistency.

Adaptation and anticipation

Enabling emerging products to gain certifications that facilitate their recognition in the market is a central vocation for ACERMI. Many innovations have benefited from certification as a direct result of the ACERMI Springboard Guidelines initiative (Référentiel Tremplin). Some innovation with particular type or shape that cannot be properly assessed using existing methods and equipment, ACERMI has even developed specific new assessment techniques. Such adaptations may be minor, as in the case of biosourced insulation products, or major as was the case for insulated formwork blocks and vacuum insulation products, which required a combination of testing and simulation methods.

CSTB laboratory manager Eric Pilch and his LNE counterpart Alain Koenen closely monitor the insulation performance assessment processes for which their own organization is directly responsible. Both stress the importance of procedures designed to produce measurements that are significant in the context of the end-user application. The ultimate aim is always to make it easier for users to choose the right product with confidence.

ABOUT ACERMI

ACERMI quality certification is granted by the Association pour la CERtifiation des Matériaux Isolants, a non-profit organization (association loi 1901) formed in 1983 by the CSTB and LNE. It enables all insulation professionals to demonstrate the performance of their insulation products to achieve certification on completion of testing, inspection and auditing.

Issue 6 of the Association pour la CERtification des Matériaux Isolants newsletter – **DECEMBER 2016**

The course of a certified insulation product

The tests used to assess an insulation product depend on its nature and sometimes involve specific pre-test conditioning. A range of different tests may be used, but those that focus on its thermal insulation capabilities remain central to the process.

The process begins in the production plant, where the CSTB or LNE auditor takes samples of the products concerned. The samples of insulation product are sent to the laboratory, where they are stored until testing in an air-conditioned storage facility at a constant temperature of around 23°C in accordance with current standards.

The first stage consists of 'identifying' the product. So to measure its level of standards compliance, all the physical characteristics for this type of product are measured: its dimensions, density and thickness. a

The next stage is for the operator to prepare the specimens for individual tests. The number of specimens used depends on the tests to be applied to the product. Several specimens are required to make a statistical calculation and deduce a representative value from that calculation. The dimension and shape of specimens used vary depending on the type of test: cylindrical for the moister transfer test and parallelipedic for the other tests.

The tests then begin, although it may be necessary to subject specimens to pre-test conditioning. Where this is the case, conditioning may take the form of drying the product, humidifying it or even subjecting it to accelerated aging. b

THERMAL TESTING. Naturally, thermal performance tests remain central to ACERMI certification. The specimens, which may or may not have been aged in advance (depending on the type of product), are loaded into heat flow meter apparatus and subjected to a temperature gradient between the two faces. Measurements of the heat rate transmitted from one side to the other, and the temperature difference between the two faces, form the basis for determining the thermal resistance of the insulation product. c

MECHANICAL TESTING. These tests aim to assess mechanical performance of insulation product under a range of mechanical loads that may affect the insulation product when installed in the building (traction, compression and creep over time). For example, insulation product installed beneath concrete screed is submitted to compression and creep testing.. Creep testing aim the determination of insulation product strain over time when installed in building floor.. It consists of subjecting the insulation product to a constant load over a period of several months, measuring the resulting deformation and extrapolating the results to achieve a 10-year value. d e

OTHER TESTS. The insulation product is also subjected to other tests that simulate the conditions it will encounter once installed. Sometimes, the installed insulation layer is exposed to moister transfer, or sometimes to direct contact with liquid water: the tests to measure the moister rate transfer and its performance when totally or partially immersed in liquid water reproduce the real-life conditions that the insulation material may encounter under such circumstances. The dimensional variations of the product are also tested and categorized to help users choosing the right product for the right installation. f g h

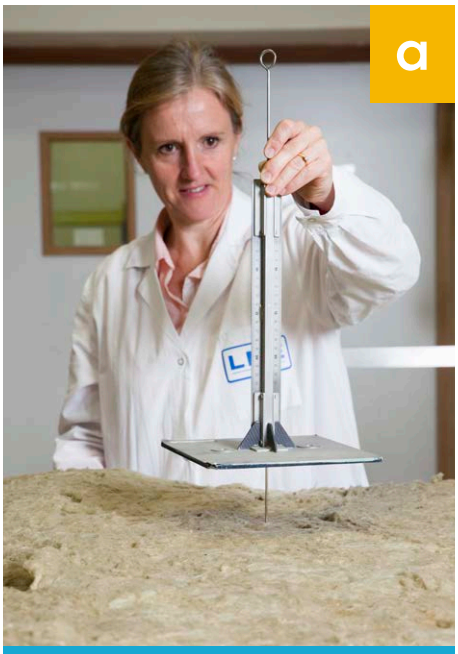
Loose fill products are subjected to three to four month settling tests including accelerated temperature and humidity cycles that simulate product installation conditions in 0.6 m x 0.6 m bins.

Once all the tests have been completed, a test report is compiled. This report is then forwarded to the certification manager, who compares the test values obtained with the values claimed by the manufacturer. ACERMI then decides whether to issue (or renew) the certificate. When the outcome is not as expected, ACERMI notifies the manufacturer accordingly.

ACERMI imposes around thirty sanctions per year, ranging from an additional audit to permanent suspension of certification.

(*) ISOLE USAGE PROFILES:

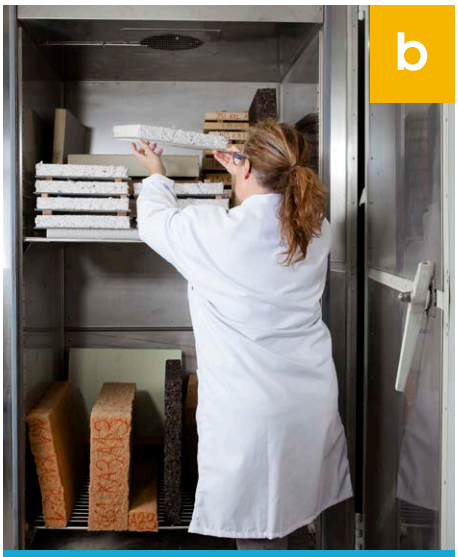
- I Mechanical properties under the effects of compression
- S Resistance to differential movements
- O Behavior in the presence of water
- L Mechanical properties for cohesion and bending
- E Water vapor permeation



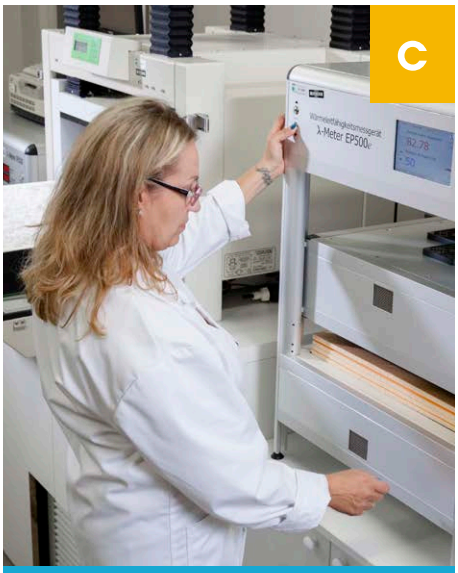
Checking the insulation product thickness (taking account of the tolerances specified by the manufacturer) is a key step before performance assessment begins. Actually it is the ratio between thickness and thermal conductivity that allow determination of thermal resistance value certified by ACERMI.

The long-term deformation of an insulation material can influence its performance. Creep testing is designed to categorize the characteristics of the product relative to the requirements imposed by installation rules.

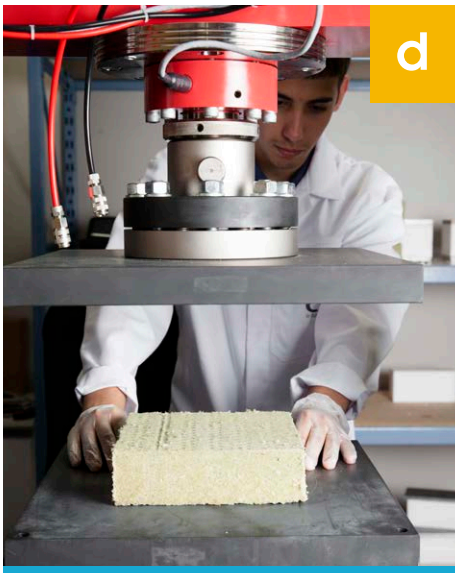
The course of a certified insulation product



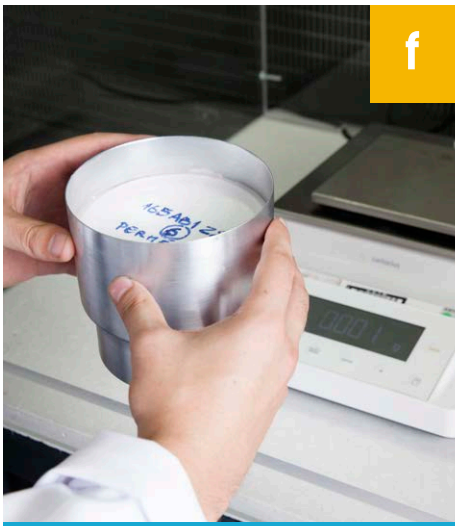
Subjecting a sample to a temperature of 70°C for a given period simulates long-term aging. The same process also checks that the product does not deforms, which could result in cracks to the coating and a non-planarity of the product surface. Its performance (thermal resistance in this case) can then be reassessed. This test is applied to products subject to compliance with a standard requiring this level of durability under specific conditioning circumstances.



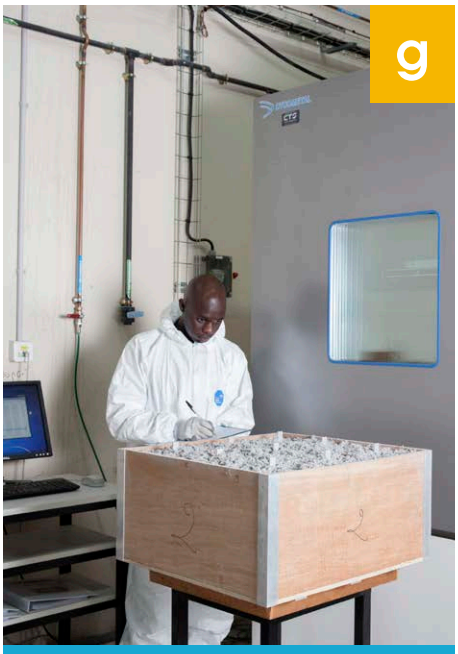
To limit heat loss through the building envelope, the insulation product must maintain its thermal properties. Insulation thermal resistance is determined by measuring the heat flow rate transmitted through its thickness between a hot plate and a cold plate. This test studies insulation product behavior and any variations of its performance. This photo shows the guarded hot plate test in progress.



Ensuring that the insulation product maintains its original form when subjected to every kind of mechanical stress. Here, compression testing (of floor insulation, for example) is used to check the compression rating claimed by the manufacturer. Its performance is the basis for its compliance with the requirements set out in official installation documents, and especially the DTU (French Unified Technical Documents).



How does the insulation material behave in the presence of water vapor? These tests simulate the capillarity that can result in all sorts of problems, including infiltration, leaks and mould growth. Successive weighing of a specimen installed into a metal cup and subjected to specific climate-controlled temperature and humidity conditions over a series of cycles is used to assess the water vapor resistance factor (μ-value or mu-value) of an insulation material, and evaluate Class E of the ISOLE* classification.



Changes in the thickness of a loose fill insulation product subject to temperature and humidity cycles must be tested to determine its settling rating. This test is a conventional one required by the settling standard. The temperature and humidity cycles run for 14 days.

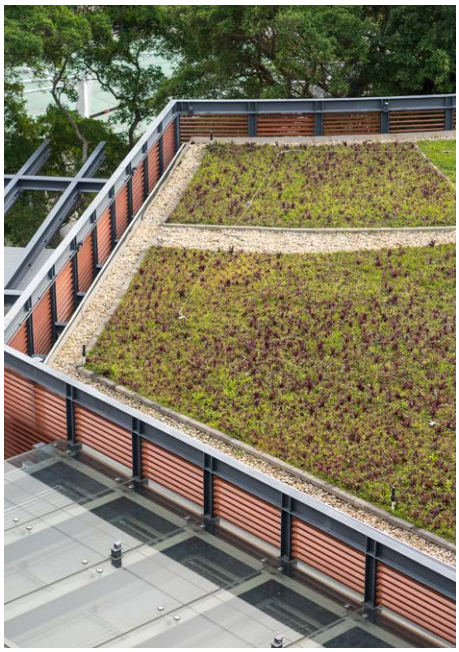
Loose fill insulation products are blown into a box of standard dimensions to check the density value of the product in use. The operator follows the recommendations set out in the ACERMI guidelines, which are designed to recreate on-site installation conditions as closely as possible.

↗ Insulation & Uses

ROOF TERRACES

Insulation panels for use beneath waterproofing systems for roof terraces

The technique of insulating roof terraces using insulation panels beneath waterproofing systems is commonly used for the thermal insulation of flat or pitched roof terraces for new-build and refurbishment projects. This technique is described in the DTU série 43 French building regulations for use in upland and lowland sites. The guide UEAtc – Cahier du CSTB 2662_V2 of July 2010 sets out the criteria and minimum suitability requirements to be complied with, depending on the accessibility and planned use of these roofs and the materials used to create the insulating layer.



Most roof terraces insulated with insulation panels installed beneath a waterproofing system are made up of the following four elements:

1. a load-bearing element (concrete, masonry, ribed steel sheet, wood and wood-based panels, etc.)

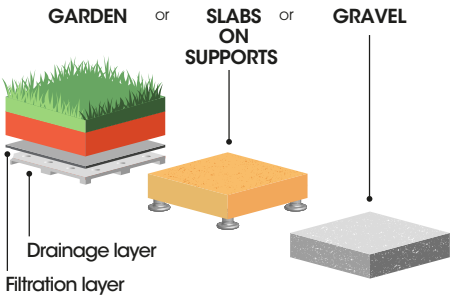
2. a waterproofing system base (insulating panel with or without vapor barrier)

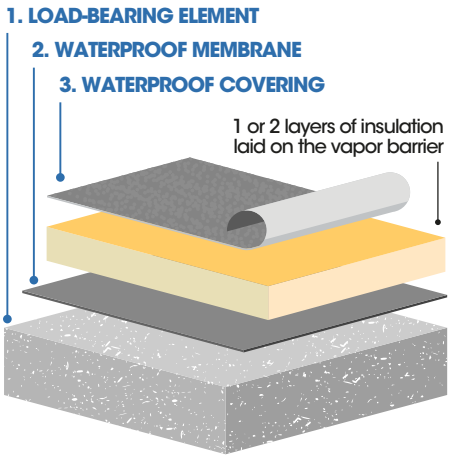
3. a waterproof membrane (single or twin layer bitumen, synthetic membrane, liquid waterproofing system, etc.)

4. a waterproof protection layer (fine gravel, slabs on studs, prefabricated concrete slabs, planted roof system, etc.)

Insulation products used in roof terraces are subject to a very varied range of thermal, hydric and mechanical stresses (fluctuations in external temperature, relative humidity, storms, compression loadings, wind-generated pressure drops imposing traction forces within the insulation material, etc.).

ACERMI certification provides proof that the insulating product used complies fully with thermal conductivity (λ) and thermal resistance (R-value) requirements. It can also certify more specific characteristics depending on the particular type of roof for which the insulation material is intended. In this way, key characteristics, such as dimensional stability, compressive strength at 10% deformation, resistance to traction perpendicular to the surfaces, sheer strength and water absorption, are all certified by ACERMI.





As part of ACERMI certification, the manufacturer benefits from production inspections conducted at least twice every year by an independent body to check that the quality of the insulation product is consistent and meets the requirements of its certification.

Once the insulation product has been correctly selected, all that remains is to follow the recommendations in the Technical Assessment or Technical Application Document to achieve long-term high insulation performance.

↗ DIARY DATES

FEBRUARY 7, 2017	**Technical meeting of the UMPI-FFB**	Hauts-de-France
APRIL 20-21, 2017	**CAPEB Construction Professional Days**	Strasbourg
APRIL 27, 2017	**'Insulation' technical meeting of the UMPI-FFB**	Mulhouse

↗ LATEST CERTIFICATES

http://www.acermi.com/isolants-certifies/derniers/

Publishing directors: Etienne Crépon and Thomas Grenon – Coordination: groupe communication Acermi.
Editorial: Bernard Aldebert, Corinne Iannaccone, Salem Farkh – Page layout: Ultralib.
Photo credits: p. 1 to 3: Florence Joubert, p. 4: Shutterstock. Printed on recycled paper with a print run of 500 copies.