



TÜVRheinland®

DIN CERTCO

Genau. Richtig.



Certification Scheme

Ceiling Mounted Radiant Panels

according to

EN 14037

(Edition: September 2021)

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1 Foreword

RADMAC (RADIators Mutual Aceptance of Certification) decided to prepare a document for the technical specifications and the controls required for a quality mark for ceiling mounted radiant panels.

This document based originally on the technical specifications of EMCP (the European Manufacturers of Ceiling Panels); DIN CERTCO, and NF quality mark specifications.

A first draft was presented to RADMAC S1 during the meeting held at WSP LAB on the 28th of April 2004. It was then completed and diffused for comments. This final draft includes all the comments received from (ATITA, DIN CERTCO, and WSPLab). The comments from EMCP and other editorial comments were added to the document during the meeting held at DIN CERTCO on the 23 September 2004. The adoption to DIN EN 14037:2016 was done by DIN CERTCO.

With a certification according to this certification scheme, DIN CERTCO offers manufacturers and suppliers of ceiling mounted radiant panels the possibility to mark their products with European quality mark "KEYMARK". Thus, they demonstrate that their products fulfil all requirements of the European standard EN 14037 for ceiling mounted radiant panels and that the products as well as the factory production control is surveyed regularly.

Demonstrating, that the product's characteristics have been carefully tested and assessed by accredited, independent, neutral and competent bodies, the European quality mark „KEYMARK“ improves customer's confidence. The customer is given a surplus that can be considered when deciding on the purchase.

Ceiling mounted radiant panels are certified with the European quality mark "KEYMARK" if they have proved their compliance with the requirements given in clause 4, 5 and 6 through the process described in this certification scheme.

All licensees are listed on the website of DIN CERTCO (www.dincertco.de) at "database". Beside the contact details of the licensees (phone, fax, e-mail and website) also the product data sheet according to Annex A with the most important product characteristics is available. Supplier, users, and consumer use this possibility for the information concerning certified products. Furthermore, this listing serves as a kind of protection against the misuse of the KEYMARK, this ensures the confidence in the DIN certification.

Start of validity

This certification scheme comes into effect on 2021-09-01. All KEYMARK certified ceiling mounted radiant panels have to be adapted to the new version of the certification scheme latest until 2022-12-31.

Amendments

This certification scheme differs from the certification scheme "Ceiling Mounted Radiant Panels – KEYMARK (2017-06) as follows:

- a) Adoption the new European Standard
- b) Limitation of the validity of the certificates to 5 years
- c) Editorial changes

Previous editions:

Certification scheme "Ceiling Mounted Radiant Panels – KEYMARK (2004-01)

Remark

The German version of this certification scheme shall be taken as authoritative. No guarantee can be given to the English translation.

2 Scope

This document gives the technical specifications related to ceiling mounted radiant panels used in wet central heating installations where the heat is transmitted inside the room mainly by radiation.

This certification scheme is applied to pre-fabricated ceiling mounted radiant panels with an air gap between construction and the emitter (not embedded). The ceiling mounted radiant panels are fed with water at a temperature below 120 °C and are installed in buildings with central heating systems. The panels should be installed with an upper thermal insulation.

It does not apply to independent heating devices and does not cover the performance of hanging accessories.

This certification scheme also defines the additional common data that the manufacturer has to provide to the trade in order to ensure the correct application of the products.

3 Testing and certification references

The following referenced documents form the basis for testing and certification. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14037-1	Free hanging heating and cooling surfaces for water with a temperature below 120 °C – Part 1: Pre-fabricated ceiling mounted radiant panels for space heating – Technical specifications and requirements
EN 14037-2	Free hanging heating and cooling surfaces for water with a temperature below 120 °C – Part 2: Pre-fabricated ceiling mounted radiant panels for space heating – Test method for thermal output
EN 14037-3	Free hanging heating and cooling surfaces for water with a temperature below 120 °C – Part 3: Prefabricated ceiling mounted radiant panels for space heating – Rating method and evaluation of radiant thermal output
EN 14037-4	Free hanging heating and cooling surfaces for water with a temperature below 120 °C – Part 4: Pre-fabricated ceiling mounted radiant panels – Test method for cooling capacity
EN 14037-5	Free hanging heating and cooling surfaces for water with a temperature below 120 °C – Part 5: Open or closed heated ceiling surfaces – Test method for thermal output
EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using test data from fire reaction to fire tests
EN 10204	Metallic products – Types of inspection documents
EN ISO 9001	Quality management systems – Requirements

EN ISO 2409 Paints and varnishes – Cross-cut test

EN 442-2 Radiators and convectors – Part 2: Test methods and rating

- This certification scheme
- CEN-CENELEC Internal Regulations, Part 4 „Certification“
- The General Terms and Conditions of DIN CERTCO
- The Testing- Registration- and Certification Regulations of DIN CERTCO
- The respective schedule of fees of DIN CERTCO

4 Technical specifications

4.1 General information

The following information relevant to the product should be specified by the manufacturer or its representative when applying for the radiant ceiling mounted radiant panels quality mark KEYMARK:

- commercial denomination (mark, range name, designation)
- production site (company name, city)
- material
- dimensions (height, width, number of tubes, diameter of the tubes, quality of the tubes)
- maximum operating pressure
- construction tolerances (drawings)
- nature of the paint
- thermal insulation used
 - nature
 - thermal resistance ($m^2 \cdot K/W$)
 - density (kg/m^3)
 - coating
 - resistance to fire
- European quality mark KEYMARK and CE marking location on the panel

4.2 Drawings

When applying for certification and use of KEYMARK for the radiant ceiling mounted radiant panels, the manufacturer of the product or its representative shall supply the drawings, where the following items are illustrated:

- welding and other assembling details (number of welding points per meter and per tube between the wet and dry surfaces)
- details of raw material used (diameter and thickness)
- wall thickness of the tube and thickness of the radiant sheet used
- maximum distance between the axes of the fixing points if it differs from the standard distance
- method of bonding the wet and dry surfaces

All design characteristics relevant for the joining process of tubes to radiant plates, as for example, number of clips per meter, length and thickness of adhesive tape, compressive force, torque of the screwed connections, length of welded joints, number of welding spots, distance between welding spots have to be shown in the manufacturing drawings and maintained during manufacture.

The dimensions shown in the constructional drawings shall be observed within the stated tolerances. The tolerances in EN 14037-1, clause 5.9 for particular models of radiant ceiling panels shall not be exceeded. They may be reduced if specified in the constructional drawings.

5 Quality requirements

5.1 Minimum requirements

The manufacturer shall have at his disposal the resources necessary to carry out inspections and tests as defined in the standards quoted chapter 3 of this document.

The manufacturer shall introduce an inspection plan, documented by procedures, instructions and specifications. The frequency of sampling is left to the discretion of the manufacturer, but must at all times be representative of the production (all requirements are detailed hereafter).

The results of inspections shall be recorded on registers or other supporting documents dedicated to this purpose and stored in compliance with documented procedures.

The results of the inspections shall be contained within the tolerances indicated in the manufacturer's drawings and/or the inspection instructions.

Dimensional tolerances shall be no higher than those indicated in all standards concerning these products.

The inspection plan shall by obligation comprise as a minimum the inspections and tests described for the panels.

The purchase documents have to describe clearly the requirements of the ordered products.

5.2 Extended quality management system (QMS)

The manufacturer's quality management system shall refer at least to the minimum quality requirements given in the list below. The following requirements of EN ISO 9001 should be used as a proposal for manufacturers, which are not certified according to this standard but have a quality management system.

Chapter of EN ISO 9001	QUALITY ORGANISATION REQUIREMENTS
4	Context of organization
4.3	Determining the scope of the quality management system
4.4	Quality management system and its process
5	Leadership
5.1	Leadership and commitment
5.1.1	General
5.3	Organizational roles, responsibilities and authorities
6	Planning
6.1	Actions to address risks and opportunities
7.1	Resources
7.1.1	General
7.1.2	People
7.1.5	Monitoring and measuring resources
7.2	Competence

7.5	Documented information
7.5.1	General
7.5.2	Creating and updating
7.5.3	Control of documented information
8	Operation
8.1	Operational planning and control
8.4	Control of externally provided processes, products and services
8.4.1	General
8.4.2	Type and extent of control
8.4.3	Information for external providers
8.5.1	Control of production and service provision
8.5.2	Identification and traceability
8.5.4	Preservation
8.5.5	Post-delivery activities
8.6	Release of products and services
8.7	Control of nonconforming outputs
9.1	Monitoring measurement, analysis and evaluation
9.1.1	General
9.2	Internal audit
9.3	Management review
10	Improvement
10.2	Nonconformity and corrective action

6 Product requirements

6.1 General manufacturing requirements

The maximum surface temperature of the lateral edges shall not exceed the minimum surface temperature of the radiant sheet between the last two wet surfaces. For ceiling panels with a construction according to EN 14017-1, Figure 1 with a tube pitch of X (mm), the distance between the axis of the outside tubes and the edges has to have a minimum distance of 0,5 X (mm).

The panel is freely suspended above the useful space and designed to be a permanent part of the building although not a part incorporated in the building structure. Air flow across the panel is to be prevented.

6.2 Surface protection (Painting and surface treatment)

The surface protection required in EN 14037-1, clause 5.2 may be ensured also by methods other than coating (e.g. galvanising, chromium plating, anodising or by virtue of the basic material itself, e.g. high-grade steel, copper etc.).

The requirement has to be proved by a certificate (e.g. by the coating supplier) that under normal operating conditions no dangerous substances are handed in (see also EN 14037-1, clause 5.12). The panels shall be coated to one of the following coating levels.

Table 1 Coating levels

Coating level	Description of the coating	Possible type of installation
Level 1	The visible surface (except the tubes) is coated.	Inside in a dry room, used for heating only
Level 2 (Level 1 is included)	The visible surface including the visible part of the tubes is coated.	Inside in a dry room, used for heating only
Level 3 (Level 2 included)	Visible and top surfaces of panel are coated (except where covered with foam).	Inside in a dry room, used for heating and cooling without condensation
Level 4 (Level 3 included)	All the components are separately coated before assembling or made of non-corrosive materials.	Inside in a dry and wet room, used for heating and cooling
Level 5 (Level 4 included)	All the components are galvanised, have a non-corrosive cover protection or made of non corrosive-materials	Outside and inside in a dry and wet room, used for heating and cooling

The coating level shall be declared in all manufacturers' literature describing these panels.

In general the coating control should be performed at least in the following frequency:

- once a week for preliminary treatment and for the cross-cut test according to EN ISO 2409¹,
- once a year for humidity test (for coating levels 4 and 5) according to EN 442-2, Annex K.

6.3 Inspection of components and raw material

The manufacturer should ensure the quality of the production by different means to check the components and raw material.

- Tubes: diameter and wall thickness
- Radiant sheets: material thickness and state of the radiant sheets surface (e.g. presence of corrosion)

According to EN 14037-1, clause 5.3 the manufacturer has to declare the materials used for the manufacturing of ceiling mounted radiant panels inclusive the surface protection. The quality of the material shall be documented by manufacturer's certificate in accordance with EN 10204, clause 2.2.

Storage of the raw material shall be performed in such a way that surface damage by mechanical impact or by corrosion is precluded.

The raw material shall be labelled such that the source and the quality of the material can be demonstrated at any time.

¹ EN ISO 2409 is used for the cross-cut test in EN 442-1, clause 4.

For the thermal insulation and paint, the manufacturer has to proceed a regular inspection or other necessary activities to ensure the conformity of the bought products. It is recommended that a certificate is requested from the suppliers.

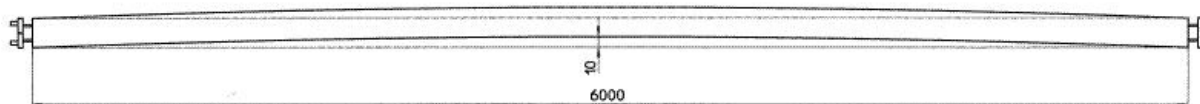
6.4 Surface emissivity

According to EN 14037-1, clause 5.3, the radiant surfaces of the active length have to prove an emissivity of at least 0.8 and determined according to EN 14037-3, clause 4.2.

6.5 Mechanical resistance

6.5.1 Horizontal curvature

Horizontal curvature shall be no more than 10 mm for a 6 m panel when cold (without load); shorter units shall have a maximum deflection in proportion.



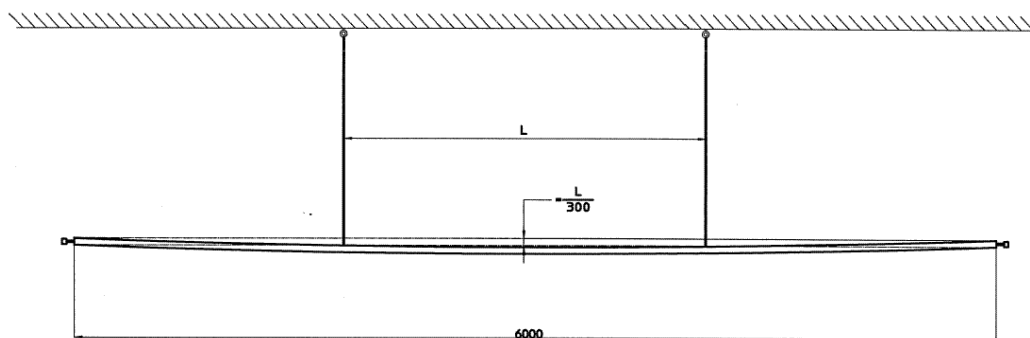
Picture 1 Drawing for showing the horizontal deflection

These tolerances apply only to manufactured panels before installation, since site welding can cause distortion.

The control test shall be done every 6 months.

6.5.2 Vertical deflection

The maximum vertical deflection (because of dead load and without thermal insulation) between fixing points shall be no more than the distance between the fixing points divided by 300 (thus the maximum vertical deflection would be 7 mm for a 2 m distance between fixing points, 10 mm for 3 m between fixing points, etc.).



Picture 2 Drawing for showing the vertical deflection

These tolerances apply only to manufactured panels before installation, since site welding can cause distortion.

The initial type tests to check the horizontal curvature and the vertical deflection of the radiant panel shall be performed by the manufacturer. It is the responsibility of the manufacturer to

ensure this by re-testing whenever there is a change in the product. The control test shall be done every 6 months.

6.6 Resistance of fixing points

The anchoring or fixing points shall be controlled according to EN 14037-1, clause 5.6.

The anchoring or fixing points of the ceiling mounted radiant panels must withstand a load equal to 5 times the proportional dead load under operating conditions without failure and a load equal to 3 times the proportional dead load without any visible deformation.

The initial type test to check the stability of the ceiling mounted radiant panel shall be performed by the manufacturer. It is the responsibility of the manufacturer to ensure this stability by re-testing at the above conditions whenever there is a change in the product.

The control test shall be done every 3 months with:

- 3 times the proportional mass of the panel under operating conditions and
- 5 times the proportional mass of the panel under operating conditions

6.7 Pressure tightness

Each panel shall be checked according to EN 14037-1, clause 5.7.

The headers and their connections to the tubes of the active length (wet surface) of all the products leaving the factory shall be tested for leaks with a test pressure equal to at least 1.3 times the maximum operating pressure stated by the manufacturer.

6.8 Over pressure

The manufacturer shall check at least once a week the resistance to the pressure according to EN 14037-1, clause 5.8. The level of standard working pressure has to be mentioned inside the technical documentation in accordance with Table 2 below.

In case of a fail (leak or deformation) in the weekly overpressure test, the manufacturer has to analyse the causes of the failure. He has to take all reasonable steps to prevent a repetition. The next three panels of this type should be tested without a fail before normal manufacture is restarted.

The following table shows the different working pressure levels and the corresponding test and overpressure levels.

Table 2 Pressure levels

	Working Pressure (WP)	Test Pressure (WP x 1.3)	Weekly Overpressure test pressure (WP x 1.7)
Level 1	4.0 bar	5.2 bar	6.8 bar
Level 2	6.0 bar	7.8 bar	10.2 bar
Level 3	10.0 bar	13.0 bar	17.0 bar
Level 4	16.0 bar	20.8 bar	27.2 bar

6.9 Dimensional tolerances

The dimensional deviations of parts of the panel having an influence on the thermal output shall not be greater than the tolerances indicated in the manufacturer's drawings supplied to the laboratory with the testing samples. Under no circumstances shall they be greater than those stated in Table 2. The adherence of the dimensional tolerances of the test samples shall be verified by the test laboratory before the test of the thermal output.

Table 3 Dimensional tolerances

Dimension	Tolerances
Outside diameter of tubes	± 0.50 mm
Distance between tubes	± 2 % of the distance
Length of tubes	± 3.00 mm
Length of radiant sheet	± 3.00 mm
Width of ceiling mounted radiant panel	± 6.00 mm
Thickness of sheet	± 0.08 mm
Height of lateral edges	± 3.00 mm

6.10 Upper Insulation

The upper side of the ceiling mounted heating radiant panels shall be provided with insulation if not used only for cooling. The thermal resistance of the insulation has a substantial influence on the thermal output upwards.

For standard thermal insulation material, the minimum thickness of the thermal insulation shall be 30 mm and the maximum thermal conductivity shall be 0.04 W/m·K at 20 °C or some other combinations of these is no worse (see also EN 14037-1, clause 5.10).

For thermal insulation materials other than standard (e.g. foams), the manufacturer shall specify the nature, the thickness, the thermal conductivity and the resistance to fire class.

6.11 Water flow resistance

The manufacturer shall provide documentation containing the pressure losses under different mass flow conditions to calculate water flow resistance for differing types of connections and internal circulations.

6.12 Release of dangerous substances

National regulations on dangerous substances may require, verification and declaration on release, and sometimes content, of dangerous substances, when construction products covered by this standard are placed on those markets.²

² NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction website on EUROPA accessed through: <http://ec.europa.eu/enterprise/construction/cpd-ds/>.

6.13 Reaction to fire

The reaction to fire performance of pre-fabricated ceiling mounted radiant panels shall be declared as Class A1 without the need for testing, provided that the pre-fabricated ceiling mounted radiant panels are non-coated metallic material or coated metallic material where the coating does not exceed 1.0 mm of thickness and 1.0 kg/m² of mass per unit area and where relevant the insulation material is of class A1 without testing.

Otherwise, the ceiling mounted radiant panels shall be tested and classified according to EN 13501-1. Only one model of one type is to be tested for classification in the reaction to fire class.

The class of the upper thermal insulation must be proven by a test certificate according to EN 13501-1, which specifies the corresponding class.

6.14 Rated thermal output or rated cooling output and characteristic equation

The rated thermal output Φ_D and the thermal output under different operating conditions have to be determined according to EN 14037-3:2016. The value of the rated thermal output has to be given in W/m as well as K and n of the characteristic equation $\Phi = K \cdot \Delta t^n$ [W/m] as defined in EN 14037-2:2016, clause 8.12.

The rated cooling output Φ_{CN} and the cooling output under different operating conditions have to be determined according to EN 14037-4:2016.

6.15 Surface temperature

The maximum surface temperature is assumed equal to the system design inlet water temperature. The maximum water temperature is decided by the system designer and controlled by safety devices in the heating system.

6.16 Marking and catalogue data

6.16.1 Marking

Ceiling mounted radiant panels shall be provided with the KEYMARK on the product and/or the packaging as soon as the manufacturer has received the ceiling mounted radiant panel quality mark.

The KEYMARK (see also clause 9.4) shall be well visible and permanently fixed (the marking with an adhesive label is accepted as permanent). The marking shall be fixed at the ceiling mounted radiant panel (e.g. headers) in conjunction with the corresponding registration number.

6.16.2 Data plate documentation

Within a period of 6 months after awarding the certification, the certification body shall check that all the technical data in the catalogue are in agreement with the data given in the test report in accordance with EN 14037 and the certification scheme.

The manufacturer has to provide the data within a period of 6 months after the certification is granted.

Besides, any document containing certified characteristics as well as commercial documentation should be controlled by a competent person before its diffusion.

The manufacturer shall inform the certification body of any modification on the product documentation (especially construction drawings).

The manufacturer of the ceiling mounted radiant panels shall be clearly identified in the technical documents and literature by stating manufacturer's name or the register number.

In addition to the specifications given above, technical documents (in particular accompanying documents) shall include the following information:

- reference to EN 14037 with the date of issue
- materials used for the manufacturing of ceiling mounted radiant panels inclusive surface protection
- upper insulation (according to EN 14037-1, clause 5.9)
 - thermal resistance in $\text{m}^2\cdot\text{K}/\text{W}$ and density in kg/m^3 at 20 °C
 - material of the top cover of the thermal insulation
 - fire resistance class of the materials
- maximum operating pressure (pressure level)
- maximum admissible temperature
- thermal output (the standard modular output and the output of connecting components under standard conditions, and the rated thermal output, including the exponents of the characteristic equations)
- dimensions and technical data according to EN 14037-1, clause 7.6

In addition, the manufacturer has to provide the documents for the computation of the water-side pressure drop for different kinds of connection and hydraulic systems.

All catalogues and any other literature, relevant to the ceiling mounted radiant panel, shall contain the identification code and the date of issue. The validation must also cover compliance with specific requirements of the KEYMARK.

7 Testing

7.1 Types of testing

7.1.1 Initial type test (ITT)

The applicant engages informally a qualified testing laboratory for testing ceiling mounted radiant panels, to carry out the initial type test as a model or type testing. The complete production drawings shall be submitted to the testing laboratory at the same time.

The initial type test consists of a verification of compliance with the product specifications described in clause 4, 6 and EN 14037 as well as the test to determine the standard thermal output in accordance with clause 7.3. Furthermore the applicant shall prove the operation of a reliable factory production control complying with clause 8.3.

DIN CERTCO award a temporary register number after the thermotechnical test, the test of the constructional features according to EN 14037-1, clause 5 and the test of the catalogue data according to EN 14037-1, clause 7 in accordance with the presentation and the pre-assessment of the appropriate test report. The applicant has to include the temporary registration number in its technical documentation, catalogues and lettering for printing.

The applicant obliges himself to keep the tested ceiling mounted radiant panels as well as the technical documentation, catalogues and lettering for printing unchanged up to the conclusion of the maintenance test.

A successful initial type test, attested by a complete test report according to clause 7.4, is the precondition for issuing a certificate and granting the right to use the KEYMARK.

If the initial type test has been failed, the elimination of the complained defects shall be proved by re-testing within 6 months. In case of exceeding this deadline, a new initial type test is to be engaged.

7.1.2 Verification test

The verification test includes one ceiling mounted radiant panels of each model range.

If the verification test determines standard module thermal outputs or standard module cooling output being no more than 4 % below the value measured in the initial type test, the verification test will be assessed positive, if not then clause 10.1 applies.

The testing laboratory informs the licensee of the result of the verification test and advises DIN CERTCO by way of notices according to Annex C.

7.1.3 Supplementary test

A supplementary test serves to assess the influence of technical modifications on the thermal output or cooling output of ceiling mounted radiant panels already tested and certified.

The testing laboratory examines, by inspection and own discretion, the effect of the modification on the thermal output or cooling output, if necessary by testing one or more models.

The existing certification remains valid with the former values as long as the supplementary test establishes a deviation up to ± 4 % (including) from the measured standard thermal output or standard cooling output.

If the deviation comes within a range from < -4 % and -6 %, a re-certification shall be carried out with the values obtained by percentage conversion. In the case of a positive deviation between > 4 % and 6 %, the re-certification with converted values may omit at the request of the applicant. In this case the existing certification remains valid with the lower values.

If the deviation is more than 6 %, a re-test according to clause Initial type test (ITT) as well as a re-certification shall be carried out.

The testing laboratory informs the licensee of the result of the supplementary test and advises DIN CERTCO by way of notice according to Annex D.

7.1.4 Special test

If the thermal output or cooling output of ceiling mounted radiant panels bearing the KEYMARK and a registration number is questioned, a special test may be required. In general, a special test shall be carried out as an initial type test.

The order of the special test shall be placed with the testing laboratory that performed the initial type test of the ceiling mounted radiant panels in question. DIN CERTCO places the order for special test.

If the special test identifies deviations of more than 4 % below the values determined in the initial type test, or dimensional tolerances exceeding those of EN 14037-1, table 2, the licensee concerned, will be informed thereof by DIN CERTCO submitting the test report.

The costs (the fees of the testing laboratory, the fees for selecting and transporting the ceiling mounted radiant panel concerned to the testing laboratory as well as the costs of the ceiling mounted radiant panel itself) are to be met by the applicant of the especial test.

If no non-conformities are detected in a special test that is performed on the application of third parties, the costs incurred thereby are charged to the third party that submitted the application.

7.2 Sampling

Together with the commission for testing, the client delivers to and collects from the testing laboratory the numbers of ceiling mounted radiant panels required for testing according to EN 14037-2, clause 8.2, or as agreed between client and testing laboratory, free of fees.

If manufacturer and licensee are not identical, the licensee shall ensure that the authorised agent of the testing laboratory has unrestricted access, in accordance with the provisions of this certification scheme, to the manufacturer's factory store and production site during working time.

Samples of ceiling mounted radiant panels for special testing shall be purchased by the testing laboratory or its authorised agent from commercial outlets.

Ceiling mounted radiant panels selected by the testing laboratory or its authorised agent are to be identified by permanent marking. The licensee arranges the transport of the ceiling mounted radiant panels to the testing laboratory in agreement with it.

7.3 Testing for determination of the standard thermal output or standard cooling output

7.3.1 General

The standard thermal output is to be determined in accordance with EN 14037-2 and the standard cooling output in accordance to EN 14037-4 by a qualified testing laboratory .

7.3.2 Model test

The model test is a test on a ceiling mounted radiant panels of specifies height, length and depth.

7.3.3 Model range test

All ceiling mounted radiant panels of the same design may be assigned to a type if it is expected that the thermal output or cooling output constantly changes depending on geometrical differences of one characteristic dimension of the individual models.

At least the smallest and largest building widths are to be measured within the range according to EN 14037, clause 8.1 and 8.2 for the regulation of thermal output values or cooling output values of a model test. If the proportion exceeds the value 2 more largely to smallest building

width, additionally the thermal output or cooling output is to be measured of a type lying between them. An interpolation of the thermal output and the exponent within a model test is permissible if the proportion does not exceed the value 2.

Such characteristic dimensions may be e.g.:

- width of the ceiling mounted radiant panel
- number of the tubes
- bores of the tubes

7.4 Test report

The testing laboratory informs the applicant of the test result by way of a test report in duplicate.

- a data sheet prepared by the testing laboratory in accordance with Annex A
- information of the testing laboratory about the test results in accordance with Annex B to Annex D

The test results are recorded in a test report by the testing laboratory and shall contain at least the following data which exceeded the required specification of EN ISO/IEC 17025 “General requirements for the competence of testing and calibration laboratories”.

- name and complete address of the manufacturer and factory
- name and complete address of the distributor, if differing from the manufacturer
- description of the system, if necessary using the standard number
- information to the test object
- type of test
- base of the test with issue of the date or the test object by indicating the date of reception
- type name of the manufacturer
- test results
- scope of the test report
- date of the testing
- date of issue of the test report
- date and signature of the tester and of the responsible person for the test

8 Surveillance

8.1 General

Compliance with the provisions of this certification scheme shall be verified by factory production control and third-party surveillance.

8.2 Verification Test

A verification test shall be carried out every 24 months after the initial type test according to clause 7.1.2.

8.3 Inspection of factory production control (FPC)

Licensees shall continually monitor the fulfilment of all requirements of this certification scheme. To do so, it is necessary to implement, monitor and maintain an appropriate quality

assurance system according to EN 14037-1, clause 6.3. This system shall be suitable as evidence, that materials and production – not matter if manufactured by the licensee itself or purchased from suppliers – meet the specific requirements.

The documentation of factory production control shall be retained for at least 5 years and presented for third-party surveillance.

To ensure consistent quality, the quality system shall include at least the following provisions:

- The manufacturer shall review and revise the quality system at least once a year.
- Check of measuring and testing equipment
- All the measuring and testing equipment shall be checked for precision in specified intervals.
- It has to be guaranteed by the quality management system in an appropriate way that the quality requirements are fulfilled to the compressive strength of the complete ceiling mounted radiant panel, in particular at fixing points.

The fulfilling of these requirements is surveilled by an anual inspection of the relevant production site which has to be proceeded by a qualified testing laboratory . A special report about the inspection has to be sent to DIN CERTCO.

The following items should be controlled and recorded at least once a day:

- length of the tubes
- length of radiant sheet
- bonding between the tubes and radiant sheet
- width of the panel
- height of the lateral edges
- distance between the tubes

9 Certification

9.1 Application by the manufacturer

Applications for certification with the KEYMARK shall be submitted to DIN CERTCO in written. Furthermore, the applicant has to declare that the ceiling mounted radiant panels manufactured in series, for which he applies the certification, correspond to the sample which was subjected to the type test.

The enclosed test reports generally shall not be older than 3 months on receipt of the application.

9.2 Application by the supplier or importer

If the supplier or importer applies for a certificate for ceiling mounted radiant panels that are already certified on behalf of the manufacturer, a re-test may be refrained if the manufacturer declares its consent for distribution and KEYMARK certification opposite to the supplier/importer.

The application shall be accompanied by the following documents in addition to the confirmation:

- a confirmation of the supplier/importer about the unchanged distribution of the ceiling mounted radiant panels,
- a data sheet prepared by the testing laboratory according to Annex A,
- an information by the testing laboratory according to Annex B.

9.3 Applications in the case of transfer of the production of certified ceiling mounted radiant panels

If the production of already tested and certified ceiling mounted radiant panel is transferred to another manufacturer, the latter shall apply for a new certificate.

A supplementary test in accordance with clause 7.1.3 shall be performed as well as an examination of catalogues and publications.

The application shall be accompanied by a test report of a qualified testing laboratory, confirming that the measured thermal output of a ceiling mounted radiant panel from each type does not deviate by more than 4 % from the initially tested and certified values.

9.4 Certification and right to use the mark

After successful examination of the documents submitted, DIN CERTCO grants the right to use the KEYMARK together with the corresponding registration number by issuing the certificate.



The registration number of the certificate is built up as follows: **011-8Dxxx**

For each type a single registration number is issued. Mark and registration number may only be used for the certified model or type. In product information material they may only be used with clear reference to the certified models or types.

The licensee may inform in all product information material (catalogues, supply documents, promotional material, internet, advertising etc) of the right to use the European quality mark KEYMARK together with the corresponding registration number.

9.5 Publications

Licensees and certified products are published up-to-date by DIN CERTCO in the internet at www.dincertco.de. Manufacturers, planers, installers, charging companies and consumers use this kind of search facility to inform themselves about certified products.

Beside contact data (telephone, telex, e-mail, website) of the licensees, also technical data of the certified ceiling mounted radiant panel may be downloaded there in the form of data sheets in accordance with Annex A.

9.6 Validity

The certificate has a validity of 5 years (the validity of distributor certificates depends on that of the manufacturer). The validity period is specified in the certificate. When the certificate expires, the right to use the mark also expires.

9.7 Renewal

If the certification is to be maintained beyond the date specified in the certificate, a positive test report of the last surveillance test (see clause 8.2) and the annual inspection (see clause 8.3) must be submitted to DIN CERTCO in good time before expiry of the validity.

9.8 Changes/additions

9.8.1 Changes/additions to the product

The certificate holder is obliged to notify DIN CERTCO immediately of any changes to the product. DIN CERTCO shall decide, in consultation with the testing laboratory, to what extent a test in accordance with clause 7.1.3 is to be carried out and whether it is a significant change. The test report on this shall be forwarded by the testing laboratory to DIN CERTCO.

If DIN CERTCO determines that a substantial change has been made, the certificate with the associated registration number shall expire. For the modified product, a new application for initial certification and the right to use the KEYMARK can be submitted.

The certificate holder is further obliged to notify all changes of formal data (e.g. certificate holder or its address).

The certificate holder may apply to DIN CERTCO for an extension of the existing certificate for further types (subtypes) of the same type. DIN CERTCO decides whether a supplementary test is required as a result of these additions. Provided that the requirements are met, the types of execution shall be included in the certificate for the product already certified and shall be deemed to be part thereof.

9.8.2 Change to the test basis

If the test basis of the certification changes, an application for a change to the certification shall be submitted within 6 months of notification by DIN CERTCO and, as a rule, after 12 months, conformity with the changed test basis shall be demonstrated by submission of a positive test report (see clause 7.1.3).

9.9 Expiry

The certificate expires, regardless of the provisions of clause 10:

- if the thermal output decreases by more than 4 % or increases by more than 6 % due to changes to a certified model or type,
- when the production of the certified ceiling mounted radiant panel is discontinued,
- in the case of transfer of the production of certified ceiling mounted radiant panel to another manufacturer,

- in the event of infringement of the provisions of this certification scheme including breach of the general terms and conditions.

10 Complaints

10.1 Detection of nonconformities

If nonconformities of certified ceiling mounted radiant panels are detected in the course of third-party surveillance or a verification test according to clause 7.1.2 by the testing laboratory or if DIN CERTCO is informed of nonconformities detected in the course of a special test according to clause 7.1.4, the licensee is required by DIN CERTCO in writing to eliminate the nonconformities and their causes and to prove this by submitting a test report about re-testing by a qualified testing laboratory, within a maximum period of 3 months from the writing date.

If re-testing gives cause for claims again, DIN CERTCO suspends the certificate and sets a deadline of 3 months from the writing date for proving the elimination of the nonconformities and their causes.

If the licensee fails to comply with this demand within the set period, or if it fails again to prove the elimination of the nonconformities, the license will be withdrawn.

During the period of suspension, the KEYMARK and the corresponding registration number shall not be used.

10.2 Other complaints

In the case of complaints not being subject to clause 10.1 but affecting the thermal output of ceiling mounted radiant panels, the procedures and deadlines specified in clause 10.1 apply.

If claims apply to technical documents, the publisher is required in writing to withdraw the objectionable documents within 30 working days, to confirm this to DIN CERTCO in writing, and to submit drafts of revised documents. If it fails to do so, another deadline of 30 days is set under threat of withdrawing the right to use the mark. If the regulations are not met within this period, the licenses are suspended.

The licensee is informed about the suspension and advised that the certificate expires if no revised documents are presented within 3 months from the writing date.

11 Testing laboratories

11.1 Preconditions for collaboration

Testing laboratories who are qualified and collaborating with DIN CERTCO are responsible for testing according to EN 14037. The following preconditions shall be met for collaboration:

- Availability of test installations complying with EN 14037-2, clause 5, suitable measuring equipment for the test installation, an experienced test installation supervisor and qualified test personnel,
- Maintenance of an accreditation against EN ISO/IEC 17025 for EN 14037 of a national accreditation body evaluated by EA (European Co-operation for Accreditation),
- Availability of a set of master ceiling panels according to EN 14037-2, clause 6,

- Proof that repeatability and reproducibility are reached in accordance with EN 14037-2, clause 6.5.
- Demonstration of test installation reproducibility by regular participation in the round-robin test.

Fulfilment of the requirements above is verified by an audit undertaken by 2 assessors appointed by DIN CERTCO. For this purpose, the specifications of EN 45002 apply. The assessors draw up an audit report and submit it to DIN CERTCO.

11.2 Round robin test

DIN CERTCO organises a round-robin test once every second year.

For this purpose, two ceiling mounted radiant panels of unknown thermal output are selected. A testing schedule is prepared specifying the periods in which the qualified testing laboratories and those who are applying for collaboration as well as the reference testing laboratory shall perform the test. The testing laboratories draw up test reports according to clause 7.4 and submit them to DIN CERTCO.

In the event of justified doubts about the reproducibility according to EN 14037-2, clause 6.4 between individual testing laboratories, DIN CERTCO may order an extraordinary comparison test with the reference testing laboratory.

11.3 Application for collaboration

A testing laboratory seeking collaboration shall, besides the participation in the round-robin test, satisfy all preconditions according to clause 11.1 and confirm this in the application to DIN CERTCO (application forms may be received from DIN CERTCO or downloaded from its website).

DIN CERTCO arranges for the audit and, in the case of a positive result, admits the testing laboratory to the round-robin test. If the reproducibility has been demonstrated, a partnership with DIN CERTCO is agreed.

The costs for the application procedure shall be paid by the applying testing laboratory.

DATASHEET

Reg. No. 011-8D

(filled in by DIN CERTCO)

for testing of ceiling mounted radiant panels according to EN 14037

Certificate holder:

.....

Production site:

.....

Designation of the model (type):

Technical data/characteristics

The ceiling mounted radiant panels of this model and/or this type become determine by the following data (see dimensioned plan page 2) and the following table:

1. Design of the ceiling mounted radiant panel:
 2. Aquifer system:
 3. Material(s): heating tube:
 radiant surfaces:
 4. Surface condition:
 5. Connection of the aquifers and non-aquifers heating surface:
 6. Others:
- Depth/ width: mm
 - Height: mm
 - Construction length mm
 - Height of side frame: mm
 - Thickness of sheet: mm
 - Coating level (1 to 5)
 - Number of tubes mm
 - Outside diameter of tubes mm
 - Distance between tubers mm
 - max. operating pressure: bar
 - max. operating temperature: °C
 - Working pressure level (1 to 4)

Table 1 Heating values

Width [mm]	Number of tubes	Dry weight [kg]	Water content [kg]	Standard thermal output [W/m]	Characteristic equation $\phi = K \cdot \Delta t^n$ [W/m]	
					K	n

DATASHEET

Reg. No. 011-8D

(filled in by DIN CERTCO)

for testing of ceiling mounted radiant panels according to EN 14037

Table 2 Cooling values

Width [mm]	Number of tubes	Dry weight [kg]	Water content [kg]	Standard cooling output [W/m]	Characteristic equation $\phi = K \cdot \Delta t^n$ [W/m]	
					K	n

Dimensioned plan:

Confirmation by the testing laboratory: The dimensional plan contains all data and nominal dimensions relevant for the thermal output of the ceiling mounted radiant panel(s). Compared to the indicated nominal dimensions, the ascertained dimensions of the ceiling mounted radiant panel(s) of this model and/or type, which were tested by us, are located within the maximum dimensional tolerances of EN 14037

Test report No.: **of:**.....

Place and date

Stamp and signature of testing laboratory

Annex B Notification about the examining of catalogues and publications concerning the correctness of their content

Notification

about an examination of catalogue and publications concerning the correctness of their content in accordance with 6.16 of the certification scheme "Ceiling Mounted Radiant Panels – KEYMARK"

DIN CERTCO Gesellschaft für
Konformitätsbewertung mbH
Alboinstraße 56
D-12103 Berlin

Certificate holder

Production site

Designation of the model (type)

Basis of testing:	EN 14037-1	Technical specifications and requirements
	EN 14037-2	Test method for thermal output
	EN 14037-3	Rating methods and evaluation of the radiant thermal output
	EN 14037-4	Evaluation methods and determination of cooling output

The examination covered the content of following catalogues and publications:

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All information given in the examined catalogues and publications are correct and clear in respect of the requirements of the standards. There are no contradictions to the data recorded in the corresponding test reports.

Place and date

Stamp and signature of the testing laboratory

Annex C Notification about a verification test

Notification

about a verification test according to clause 7.1.2
of the certification scheme "Ceiling Mounted Radiant Panels – KEYMARK"

DIN CERTCO Gesellschaft für
Konformitätsbewertung mbH
Alboinstraße 56
D-12103 Berlin

Certificate holder

Production site

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Basis of testing:	EN 14037-1	Technical specifications and requirements
	EN 14037-2	Test method for thermal output
	EN 14037-3	Rating methods and evaluation of the radiant thermal output
	EN 14037-4	Evaluation methods and determination of cooling output

The verification test covered following models/model ranges:

Registration number:

Model designation:

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The standard module thermal output or standard module thermal output determined in the verification test are not more than 4 % below the values measured in the initial type test.

Place and date

Stamp and signature of the testing laboratory

Annex D Notification about a supplementary test

Notification

about a supplementary test according to clause 7.1.3
of the certification scheme "Ceiling Mounted Radiant Panels – KEYMARK"

DIN CERTCO Gesellschaft für
Konformitätsbewertung mbH
Alboinstraße 56
D-12103 Berlin

Certificate holder

Production site

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Basis of testing:	EN 14037-1	Technical specifications and requirements
	EN 14037-2	Test method for thermal output
	EN 14037-3	Rating methods and evaluation of the radiant thermal output
	EN 14037-4	Evaluation methods and determination of cooling output

The supplementary test covered following models/types:

Registration number:

Model designation:

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Description of technical changes to ceiling mounted radiant panel:

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Detected dimensional deviations from the data specified in the data sheet that was submitted with the initial application for certification are within the dimensional tolerances according to EN 14037-2, table 2. A new data sheet with the according changes is enclosed to this.

The standard thermal output or standard cooling output determined in the supplementary test does not deviate by more than 4 % from those measured in the initial type test.

Place and date

Stamp and signature of the testing laboratory