

Environmental Product Information A11-C Radiant metal ceiling

Self declaration to ISO 14021:2016 + A1:2021



Tailor-made solutions for indoor climate



Introduction

For over 45 years, Barcol-Air has been internationally active as a manufacturer and distributor of radiant ceilings. The consideration of environmental requirements is an essential part of Barcol-Air's business policies and is taken as a guide for both internal and external dealings.

Environmental product information in the form of self-declaration to ISO 14021:2016 + A1:2021 should be understood as part of Barcol-Air's fundamental attitude to environmental matters.

Contents

| Product information | 3 |
|-------------------------------|---|
| 1.1 Product description | 3 |
| 1.2 Basic materials | 3 |
| 1.3 Details of materials used | 4 |
| Declaration criteria | 5 |
| 2.1 Ecological aspects | 5 |
| 2.2 Economical aspects | 6 |
| 2.3 Physiological aspects | 6 |
| 2.4 Technical quality | 7 |
| 2.5 Quality of work processes | 7 |
| | |



1 Product information

1.1 Product description

The radiant metal ceiling A11 consist of a perforated metal ceiling panel (steel or aluminium) with or without a fleece inlay on its top surface and a bonded-on heating/cooling register in the form of aluminium heat conducting rails with a copper tube meander. All components are non-flammable. Installations such as lights, sprinklers, etc. can be integrated into the metal ceiling panel. Cooling capacity is approx. 60 % via radiation and 40 % via convection. Together with acoustic fleece and an optional additional inlay of mineral wool mats, metal ceilings form ideal sound absorbers.

The radiant metal ceiling A11 is basically maintenance-free and features a long service life (>50 years).



1.2 Basic materials

1.2.1 Steel ceiling panel

Basic materials per m² steel ceiling panel incl. substructure, approx. 10 kg

| Component | Material | Weight proportion [%] |
|-------------------------------|--|-----------------------|
| Metal ceiling panel | Galvanised sheet steel | 70 |
| Substructure | Galvanised steel | 15 |
| Tube coil | Copper | 10 |
| Heat conducting rail | Aluminium | 2 |
| Surface coating | Powder coating – polyester powder | <1 |
| Acoustic fleece | Cellulose, glass fibres, synthetic resin, halogen- | <1 |
| | free flame-retardant salt, soot pigment | |
| Heat conducting rail adhesive | Synthetic resin | <1 |

1.2.2 Aluminium ceiling panel

Basic materials per m² aluminium ceiling panel incl. substructure, approx. 7 kg

| Component | Material | Weight proportion [%] |
|-------------------------------|---|-----------------------|
| Metal ceiling panel | Aluminium | 40 |
| Substructure | Galvanised sheet steel | 33 |
| Tube coil | Copper | 20 |
| Heat conducting rail | Aluminium | 4 |
| Surface coating | Powder coating – polyester powder | <1 |
| Acoustic fleece | Cellulose, glass fibres, synthetic resin, halogen- free flame-retardant salt, soot pigment | <1 |
| Heat conducting rail adhesive | Synthetic resin | <1 |



1.3 Details of materials used

1.3.1 Steel

The radiant metal ceiling A11 is most frequently installed with steel ceiling panels. In these cases, the radiant ceiling consists of approx. 70 % galvanised sheet steel (85 % incl. substructure).

Steel is an alloy of iron and carbon (0.02 % to 2.06 %). In Western Europe, 25 % of steel is recycled (as of 2021). The steel industry reduced its primary energy consumption by 25 % between 1990 and 2021.

1.3.2 Aluminium

In a small proportion of projects, the radiant metal ceiling A11 is installed with aluminium ceiling panels. In these cases it consists of approx. 40 % aluminium and 33 % galvanised sheet steel for the substructure.

The main component of aluminium alloys is aluminium (>99 %). The main alloy components are magnesium (0.35 to 0.6 %) and silicon (0.3 to 0.6 %). The most widely used aluminium alloy is EN AW 6060 T66 (AlMgSi 0.5 F 22). A proportion of >90 % is recycled (as of 2021).

1.3.3 Copper

The copper tubes are made of copper alloy CW024A which consists of >99.9 % copper. Copper tubes are durable and robust. This contributes to the long service life of radiant ceilings. A proportion of >90 % is recycled (as of 2021).



2 Declaration criteria

2.1 Ecological aspects

2.1.1 Life cycle assessment of the building

The life cycle assessment data for ceiling systems can be taken from existing EPD environmental product declarations:

- Steel ceiling panels:
 - EPD-TAI-20180162-IBG1-DE EPD-TAI-20180164-IBG1-DE
- Aluminium ceiling panels: EPD-TAI-20180164-I
 Stool radiant aciliana
 EDD TAI-20180162-I
- Steel radiant ceilings: EPD-TAI-20180163-IBG2-DE

2.1.2 Environmental risks

| Component | VOC | Formaldehyde | GISCODE | Others |
|---------------------------|---------------|--------------|--------------------------|--|
| Metal ceiling panel made | - | - | - | - |
| of galvanised sheet steel | | | | |
| Metal ceiling panel made | - | - | - | - |
| of aluminium | | | | |
| Substructure | - | - | - | Free from lead, mercury, cadmium or chromate compounds |
| Powder coating | - | - | GISCODE BS10 is not used | Free from lead, mercury, |
| | | | in powder coatings | cadmium or chromate |
| | | | | compounds |
| Copper tube | - | - | - | - |
| Aluminium heat | - | - | - | - |
| conducting rail | | | | |
| Adhesive for heat | No | Free from | - | - |
| conducting rail | substances in | formaldehyde | | |
| | boiling range | | | |
| | from 50 to | | | |
| | 260 °C | | | |
| Acoustic fleece | - | | - | - |
| Total | - | - | - | - |

2.1.3 Responsible resource extraction

The radiant metal ceiling A11 contains no materials made from wood. This eliminates the need for FSC/PEFC certification.

2.1.4 Drinking water demand and waste water generation

The heating/cooling circuit is filled with drinking water (approx. 0.75 l/m²). This circulates and no waste water arises.



2.2 Economical aspects

2.2.1 Operation

Operation of radiant ceilings can be energy efficient and optimised for operating costs with low flow temperatures.

2.2.2 Service life

According to the table "Nutzungsdauer von Bauteilen für Lebenszyklusanalysen nach Bewertungssystem Nachhaltiges Bauen (BNB)" (Service life of components for life cycle assessments according to the rating system for sustainable building) published by the Bundesinstitut für Bau-, Stadtund Raumforschung (BBSR) (Federal Institute for Research on Building, Urban Affairs and Spatial Development) in February 2017, the service life of metal ceilings (code 353.211) is >50 years.

2.2.3 Conversion of office spaces

Barcol-Air radiant ceilings are designed to enable conversion of office spaces at any time. Individual ceiling elements can be removed, moved or replaced. The substructure of the suspended metal ceiling is suspended from the ceiling slab and is thus the only load bearing element.

With the radiant metal ceiling A11 there is no additional cost for removal or demolition.

2.3 Physiological aspects

2.3.1 Thermal room comfort

The radiant metal ceiling A11 provides 60 % of its cooling capacity via radiation, thus enabling continuous air conditioning without annoying air movements. Humans tend to find temperature control by radiation more pleasant than by convection. All Barcol-Air radiant ceilings are tested for thermal comfort indicators according to ISO 7730 and SIA 382/1.

2.3.2 Air quality

Barcol-Air radiant ceilings have no adverse effect on indoor air quality. No formaldehyde or VOC emitting substances are used in any of the components. All coatings are applied at the factory, minimising contamination of the building.

2.3.3 Room acoustics

Due to their large surface areas, the radiant metal ceiling A11 and suspended ceilings in general are generally very suitable for improving room acoustics. Barcol-Air has the various parameters that influence the room acoustics of metal ceilings (acoustic fleeces, perforations, mineral wool mats) tested by independent institutes to ISO 354 and evaluated to DIN EN ISO 11654. Sound absorption coefficients $\alpha_{(w)}$ of up to 0.8 can be achieved. It is possible to comply with room acoustic class B to VDI 2569.

2.3.4 VDI 6022 / SWKI 104-01 hygiene conformity

All air conditioning elements of Barcol-Air radiant ceilings are tested by independent institutes for hygiene conformity to VDI 6022 / SWKI 104-01. In addition to testing for prohibited substances, this also includes the opportunity to clean and test all utilised materials for their metabolic potential to ISO 846 for microorganisms (e.g. fungi, bacteria).

2.3.5 Light quality

The design of lighting concepts is a task for specialist companies. The radiant metal ceiling A11 has a high light reflectance value of approx. 90 % (white, RAL 9010) for effective daylight distribution.

2.3.6 Visual comfort and building automation

Barcol-Air radiant ceilings are customised for each project in terms of architecture, lighting design and fire prevention. This makes them a visual element of the interior design and, by incorporating measurement and room control instruments as well as safety installations such as smoke detectors and sprinklers, they become an essential part of a fully integrated building.

2.3.7 User-product interaction

Depending on the type of control, the user can adjust the room temperature individually.



2.4 Technical quality

2.4.1 Cleaning

Depending on the degree of contamination, powder coated surfaces can generally be cleaned without having to use chemicals. The ceiling cavity is readily accessible for cleaning through inspection hatches or by easy removal of individual metal ceiling panels.

The hygiene conformity test to VDI 6022 / SWKI 104-01 for air conditioning elements includes testing for easy access and cleaning options.

2.5 Quality of work processes

2.5.1 Management

The Barcol-Air Group AG with its offices in Switzerland and the production centre Barcol-Air Production GmbH in Germany are certified to ISO 9001. Relevant internal processes are tested at random in annual audits, analysed in depth in re-certification programmes and constantly refined.

2.5.2 Social fairness

The wellbeing of employees, customers and shareholders is central to Barcol-Air. Barcol-Air's mission statement, which has been valid since 2018, is based on this principle.

2.5.3 Occupational safety

Occupational safety is top priority. As one of the joint signatories of the Safety Charter, an alliance for better occupational safety of partners involved in the work, Barcol-Air is committed to complying with safety regulations at work. The objective is to preserve the life and health of everyone involved.

2.5.4 Office operations

In office operations, Barcol-Air backs the conservation of resources and recycling. Examples are a drinking water station connected to the water mains with water jugs and individual drinks bottles for employees, waste separation, recycling of coffee pads, toner cartridges, etc., use of FSCcertified paper and reduction of paper consumption, LED bulbs and motion sensors for lighting, second hand office furniture and energy efficient radiant ceilings.

2.4.2 Removal or replacement

Individual panels of the radiant metal ceiling A11 can be removed or replaced without detriment.

2.4.3 Wastage and scrap during installation

As Barcol-Air radiant ceilings are always manufactured specifically for each project, so wastage and scrap occurring during installation are kept to a minimum. Unavoidable waste is disposed of by specialist disposal companies. Essential packaging materials are specially selected for each project with the aim of generating little waste.

2.5.5 Documentation

Revision documents prepared as standard for each completed project include instructions for use, maintenance, checks and care/cleaning.

All documentation relevant to the project is electronically stored by Barcol-Air for at least the legally required period.

2.5.6 Production

The power requirements for the Barcol-Air radiant ceiling production centre, the Barcol-Air Production GmbH in Germany, are covered by 100 % green electricity.

As Barcol-Air radiant ceilings are always manufactured specifically for each project, wastage and scrap arising during production are reduced to a minimum. Unavoidable waste is disposed of by specialist disposal companies.

Essential packaging materials are specially selected for each project with the aim of generating little waste.

2.5.7 Construction process

Contracted companies are requested to comply with requirements regarding waste, noise, dust, ground and water protection specific to the site and are monitored. All components are delivered to the construction site ready for installation and generally require no further processing.

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