

Air tightness instructions

**Sandwich panels SPA, SP2B PU/PIR, SP2D PU/PIR,
SP2E PU/PIR, SPB W, SP2D W**

With Ruukki's panel system you can easily build an energy-efficient envelope. Good air tightness is an essential element of an energy-efficient envelope and therefore deserves special attention. In these instructions, we have compiled the key issues to be considered when designing, installing and maintaining an airtight envelope.

Ruukki is a metal expert you can rely on all the way, whenever you need metal based materials, components, systems or total solutions. We constantly develop our product range and operating models to match your needs.

- **Design**

- Utilize Ruukki's system details**

- Air leaks can be prevented at the design phase, by paying attention to joint details and their functionality. We recommend using Ruukki's system details, in order to simplify on-site installation work and ensure the air tightness of joints installed on-site. When applying any special details, we also recommend the use of system details as a starting point.

- Minimize the number of penetrations**

- Careful consideration should be given to the placing and number of penetrations in design work, particularly in HVAC and electrical design. Whenever possible, you should also consider combining multiple penetrations to minimize the number of them. We recommend to use sleeves Prefabricated collar flanges are worth using in penetrations. In certain constructions, e.g. in roof penetrations, the use of sleeves is mandatory. When choosing a sleeve profile, you should pay particular attention to the adjoining structures and any thermal bridges you need to avoid.

- Ensure success through collaboration and training**

- Good collaboration is the basis of a successful project. Keeping all of the relevant parties informed of any revisions, and the related impact, ensures that immediate action can be taken when required. Collaboration between the site and designers ensures that any decision taken on-site will comply with the designs. New details and structural solutions which work in practice should be carefully documented for use in future projects. In addition, any solutions that don't work should also be documented, in order to improve the quality of work.

It is worth taking advantage of the training organized by Ruukki, on maintaining and enhancing skills in sealing solutions. In this way, you will ensure that the customer obtains a solution meeting its requirements and objectives.

- **Installation and supervision**

- Handling**

- By handling, storing and protecting the products on-site in accordance with Ruukki's instructions, you will prevent the panels from being damaged. Pristine and undistorted elements are easier to handle, fitting easily into place. This will also eliminate unnecessary sealing work. Using high-quality tools and materials ensures a high-quality outcome. The warranty issued by Ruukki will only be valid if you comply with Ruukki's instructions and guidelines. The products must be protected against weather, for example to avoid water getting into the panel core.

- Communication**

- Both collaboration and communication are imperative on-site. Ensuring a high-quality outcome requires that installers performing installation work are fully and clearly informed of the requirements set for the project.

In the event of an unexpected situation, installers must not take independent decisions e.g. regarding a seal or cutting a corner. If the designs do not cover the situation in question, site supervisors must be notified. They will determine the best applicable solution to the situation, in co-operation with the designer. If an independent decision is nevertheless made, a complete deviation report on the decision must be issued, in accordance with Ruukki's guidelines.

Supervisors must also be notified of any product defects or deficiencies. For example, if a window unit's glazing has defective sealing, the window must not be mounted and a complaint must be lodged with the manufacturer.

Training and induction

Ruukki organizes training on panel installation work. We develop our training content on a continuous basis, to take account of new solutions.

Prior to on-site installation work, the project objectives, including those related to air tightness, must be discussed in induction training.

Quality control

Mock-up reviews are used for quality control purposes. The objects and sealing work to be inspected will be determined in advance. The contractor must perform mock-up work using the same products and under the same conditions as actual work. All participants must attend the mock-up review session and contribute to approving the air tightness of the mock-up. Only after the inspection and approval of the mock-up work may the contractor continue with the project.

The air tightness of joints can be ascertained using surface thermometers. Thermal imaging is recommended for locating air leaks. This requires a sufficient thermal difference across the building.

Air tightness at the joints can also be investigated using marking substances, for example, smoke or a marking gas. Marking smoke helps in detecting the air infiltration/exfiltration visually, as the smoke passes through the leaks.

Documentation is integral to quality control

The contractor must report on all factors affecting work and its quality. It must also issue a deviation report whenever a deviation from the designs occurs, or an independent decision is made. The contractor must also photograph all seals, so that they can be verified after molding. Concurrently with the installation of structural components and the completion of a work phase, a marking must be made on the details. The designated person in charge of the work phase will perform the marking, in order to indicate completion of the phase. The designer is responsible for issuing a checklist on the details, indicating the correct work sequence.

● Maintenance and monitoring

Monitoring of air tightness

The notification procedure*) requires monitoring the air tightness of the buildings based on three-year monitoring periods. During a monitoring period, at least three buildings completed within the monitoring period must be measured. In addition, a new leakage value must be calculated and stated for each building type, for use in subsequent projects.

Prevention of air leaks

For example, new penetrations made by the user can be expected to generate air leaks. New air leaks due to user-made penetrations can be prevented by following the user guide's instructions on making and sealing new penetrations and on mounting fixtures. The purchaser/user is responsible for any air leaks caused by subsequent penetrations or other such installation work.

*) A voluntary airtightness declaration issued by Helsinki University of Technology. Provides an air tightness value, which can be used without a need to pressure test each building separately. For more information contact Ruukki Technical Support.

Air tightness, checklist for design stage

This list is intended to support design work in issues related to air tightness. Using this list does not release the designer from any of its liabilities.

Item to be checked:	Yes/No	To be noted:
What is the required air tightness rating?		
Have the penetration points been updated to reflect the current situation?		
Has the number of penetrations been minimized?		
Have prefabricated units been used in the penetrations?		
Has a sealing plan been made for special penetrations?		
Have the basic details been used in the joints?		
Has a sealing plan been made for special joints?		
Have the products been marked on the details in accordance with the work sequence?		
Have on-site decisions deviating from the details been commented on?		
Have the required objects for mock-up work been defined?		
Has the air tightness of the mock-up work been approved?		

Other important issues related to air tightness:

Place and date

Signature

Air tightness, on-site checklist

This list is intended to provide on-site support in issues related to air tightness. Using this list will not release the contractor from its liabilities.

Item to be checked:	Yes/No	To be noted:
What is the required air tightness rating?		
Has sealing work been rehearsed in advance?		
Does the storage of materials comply with instructions?		
Does the handling of materials comply with instructions?		
Has training been organized regarding the installation of the products to be used?		
Did the circumstances during installation deviate from those stated in the manufacturer's instructions?		
Does the quality of the products to be used conform to the manufacturer's promises?		
Has there been any deviation from the details?		
Has a deviation report been issued on the deviations?		
Has information on the prevailing circumstances been entered in the site log?		
Have the sealing works been documented and photographed?		
Have the required mock-up works been defined?		
Has the air tightness of the mock-ups been approved?		

Other important issues related to air tightness:

Place and date

Signature

Air tightness, checklist for site supervision purposes

This list is intended to support monitoring in issues related to air tightness. Using this list will not release the monitoring party from its liabilities.

Item to be checked:	Yes/No	To be noted:
What is the required air tightness rating?		
Has the required mock-up work been defined?		
Has the air tightness of the mock-ups been approved?		
Have the reports and photographs on sealing work been delivered?		
Has due care and attention been exercised in sealing work?		
Is there a need to measure the air tightness of the completed building?		

Other important issues related to air tightness:

Place and date

Signature

Air tightness, checklist for maintenance purposes

This list is intended to support design work in issues related to air tightness. Using this list will not exempt the designer from its liabilities.

Item to be checked:	Yes/No	To be noted:
What is the required air tightness rating?		
Has the air tightness of the building deteriorated?		
Have air leaks in a deteriorated building been located by means of thermal imaging?		
Are there any visually discernible changes at the joints?		
Have subsequent penetrations been added?		
Is there any discernible disintegration of the sealants applied to the seals?		
Other important issues related to air tightness:		

Place and date

Signature

• **Our customer service will be happy to give you more information.**

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