QUALITY REGULATIONS FOR PANELS AND PROFILES

OCTOBER 2020

European Association for Panels and Profiles

Contents

Scope

The Quality Regulations for Panels and Profiles cover both, panels and cold-formed profiles. The first chapter of the document includes common information for both products. Specific regulations for panels are given in the second chapter and for profiles in the third chapter.

These Quality Regulations come into force after they have been accepted by the General Assembly of the "European Association for Panels and Profiles" (PPA-Europe).

The latest version of these Quality Regulations has to be used in any case.

For all standards mentioned, the last version published by CEN is the basis of these Quality Regulations.

These Quality Regulations are valid for panels and profiles, which are covered by the scopes of the following harmonized European standards:

– EN 14509 – Self-supporting double skin metal faced insulating panels – Factory made products – Specifications
– EN 14782 – Self-supporting metal sheet for roofing, external cladding and internal lining, for self-supporting profiles
– EN 1090-1 – Execution of steel structures and aluminium structures – Part 1: Assessment and verification of constancy of performance for structural components, for structural profiles

It is the intention of these Quality Regulations to establish a quality assurance system for the fabrication of panels and profiles, mainly based on independent third party control. The behaviour, the geometry and the visual aspect of the products after installation do not constitute a subject matter of the quality assurance system.

The task of PPA-Europe is to get experienced third parties to ensure a quality assurance system. The EPAQ scheme requires (see also table 1.4):

– system A for mechanical and insulation properties,
– system B for reaction to fire of panels,
– system C for reaction to fire of structural profiles,
– system D and E for reaction to fire of self-supporting profiles,
– system D for tightness properties of panels.

Abbreviations

CD	Certification Document
EPS	expanded polystyrene
EQC	External Quality Control
FPC	Factory Production Control
hENs	harmonized European standards
MW	mineral wool
PUR	rigid polyurethane foam (PUR includes polyisocyanurate foam (PIR))

1 QUALITY ASSURANCE SYSTEM EPAQ

1.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

1.1.1 EPAQ

EPAQ is the abbreviation for “European Panels and Profiles Assured Quality”. The Quality Label EPAQ will be awarded by the Quality Committees of the European Association for Panels and Profiles (PPA-Europe, or the association). A list of accepted parties according to 1.1.2 to 1.1.5 will be provided under the EPAQ scheme.

The Quality Label EPAQ, as well as the Certification Document and the Quality Certificate based on which it is awarded, are not a substitute for the mandatory CE marking and Declaration of Performance.

1.1.2 Third parties

The tasks of third parties are:

- Type testing of mechanical and dimensional characteristics and writing the test report;
- Type testing of tightness properties and writing the test report;
- Type testing of thermal conductivity and writing the test report;
- Evaluation of the results of type testing of mechanical and dimensional characteristics and writing the evaluation report (task only for independent experts);
- Checking of the evaluation of the type testing on mechanical and dimensional characteristics and writing the checking report (task only for independent experts of the Quality Committees);
- Responsibility for the information in the CD related to the fire behaviour (mainly reaction to fire); analyse of the type testing data for fire characteristics and writing the assessment report (task only for independent experts for fire);
- Responsibility for the information in the CD related to thermal characteristics; tasks within the EPAQ procedure for obtaining the Lambda and U-values and writing the assessment report (task only for independent experts for thermal characteristics);
- Initial inspection, including attending the inspection and writing the assessment report;
- Regular testing of mechanical and dimensional characteristics as part of the EQC and writing the test report, the evaluation report and the assessment report for EQC;
- Regular testing of thermal conductivity as part of the EQC and writing the test report;
- Regular assessment of the FPC as part of the EQC, including attending the assessment and writing the FPC assessment report.

Third parties may be recognized for one or more fields of experience of the above mentioned tasks with regard to panels and/or profiles.

Third parties are:

- Independent laboratories according to 1.1.3;
- Independent experts according to 1.1.4;
- A combination of an experienced independent expert acting together with a not-accepted or possibly not impartial laboratory, or
- Independent laboratories or independent auditing bodies for initial inspection and regular assessment of FPC.

1.1.3 Independent laboratories

Independent laboratories can only be laboratories with sufficient experience in testing of panels and/or profiles and in evaluation of test and test results of panels and/or profiles. Independent laboratories that are working under the EPAQ scheme should be bodies, notified by the notifying authorities of EU members states for products according to the standards mentioned in 1.2.

If an independent laboratory does not fulfil this requirement or if there is no notified body for some characteristics defined in the European product standards, the relevant Quality Committee can make a decision

about the acceptance of the laboratory as an independent laboratory of the EPAQ scheme, by checking its competence in testing and/or evaluating test reports on panels/profiles.

Independent laboratories are not allowed to evaluate or to prepare the evaluation report of type testing. This task can only be done by an independent expert.

1.1.4 Independent experts

1.1.4.1 General

An independent expert is an individual or an individual within a testing laboratory with recognized knowledge in panels and/or profiles technology. In case of FPC assessment, it is also possible that the responsible independent expert is a member of an auditing body.

The independent experts of the Quality Committees have to decide on persons with enough knowledge on panels and/or profiles who want to become independent experts for one or more of the following tasks:

- Responsibility for the type testing according to 1.2.2.2.3, including attending the testing and writing the test report;
- Evaluation and preparation of evaluation report of type testing;
- Responsibility for the initial inspection, including attending the inspection and writing the assessment report;
- Responsibility for the EQC, including attending the EQC and writing the test report, the evaluation report and the assessment report for EQC.

1.1.4.2 Independent experts for fire

The independent experts for fire are nominated by the existing independent experts for fire of the association. Their task is to check the data regarding fire and to analyse the range of validity of existing test reports.

1.1.4.3 Independent experts for thermal characteristics

The independent experts for thermal characteristics are nominated by the existing independent experts for thermal characteristics of the association. Their task is to evaluate the results of the type testing of λ, to calculate or check the U-values and to analyse the range of validity of existing test reports.

1.1.5 Independent auditing bodies

In case of initial inspection and regular FPC assessment, the auditing body is responsible for assessment and writing the assessment report. The independent experts of the Quality Committees decide on the auditing bodies that are working under the EPAQ scheme.

1.1.6 Test report

Includes all basic test results without calculation of statistical evaluation and other further steps.

1.1.7 Evaluation report

Report worked out by an independent expert determining basic values and properties as a base for awarding and maintenance of the Quality Label on the base of the relevant assessment and test reports.

The evaluation report drawn up by an independent expert for fire is called “Assessment report for fire properties” and the evaluation report drawn up by an independent expert for thermal characteristics is called “Assessment report for thermal characteristics”.

1.1.8 Assessment report

The reviews are the result from EQC and FPC in comparison to declared values on the Declaration of Performance and on the Certification Document and in comparison to the requirements of these Quality Regulations.

Assessment reports and summaries have to be written in English, the rest can be written in the language of origin of the third party. If there are problems, the relevant Quality Committee can ask for an English version.

1.1.9 Notified bodies

Bodies assessed and notified by notifying authorities designated by the member states of the EU that are authorised to carry out third party tasks in the process of assessment and verification of constancy of performance for the purposes of the Construction Product Regulation. According to the relevant hENs for panels, profiles (see Scope) and used core materials, notified bodies are active for fire and insulation properties only.

1.2 Basis of the Quality Assurance System

1.2.1 General

1.2.1.1 Technical basis

Technical basis of the quality assurance system are the European standards:

– EN 14509 for panels;
– EN 14782 for self-supporting profiles;
– EN 1090 for structural profiles,

when there are no special regulations given by the Quality Committees. The rules of the Quality Regulations are valid for products used for applications, which are for normal European outdoor and indoor conditions in normal buildings, including cold stores.

Concerning the reaction to fire of the products according to EN 14509, the manufacturers must own the certificate of constancy of performance of the product drawn up by a notified product certification body.

Concerning the reaction to fire of the products according to EN 1090-1, the manufacturers must own the certificate of conformity of the FPC drawn up by a notified production control certification body.

The control of the production is carried out by means of plant's own production control and external control in accordance with the stipulations of these regulations.

The association concludes contracts with the third parties authorized with different tasks under the EPAQ system.

The manufacturer must conclude a control agreement with a third party authorized by the association with the control task, which will observe the requirements in accordance with the Quality Regulations.

The implementation of the inspections and the type of documentation are regulated by the Quality Committees, in agreement with the third parties which carry out the external control.

The reports of EQC shall be retained for at least five years.

1.2.1.2 Quality management system

Companies with a Quality Label EPAQ shall have a quality management system ISO 9001:2015 or higher with implemented FPC, or have to follow the requirements of a quality management system ISO 9001:2015 or higher with implemented FPC.

1.2.2 Requirements for third parties

1.2.2.1 General

The third parties for testing and the third parties for evaluation and assessment have to attend the annual meetings of the third parties under the EPAQ scheme, to give reports about their work and to be informed about the quality assurance work of PPA-Europe. These meetings ought to be held in combination with the meetings of the Quality Committees. In case of absence or not fulfilling their duties, the following action plan is applied:

– 1st absence or contravention: Info about the obligation to attend the meetings or to fulfil its duties and the consequence that the status as third party will be denied after the 3rd absence or contravention;

– 2nd absence or contravention: Letter to explain the obligation to attend the meetings and the consequence that the status as third party will be denied after the 3rd absence or contravention;

– 3rd absence or contravention: Denial of the status as third party under the EPAQ scheme.

1.2.2.2 Requirements for third parties for testing

1.2.2.2.1 General requirements

The Testing Rules of the EPAQ scheme have to be applied by testing panels/profiles. It is not permitted to deviate from the testing procedures established in EN 14509 for panels, EN 14782 for self-supporting profiles and/or EN 1090 for structural profiles and the Testing Rules of the association.

Third parties for testing are either independent laboratories with sufficient experience in panels/profiles testing and evaluation of panels/profiles test results according to 1.2.2.2.2 or a combination of an experienced independent expert acting together with a not-accepted or possibly not impartial laboratory according to 1.2.2.2.3.

1.2.2.2.2 Requirements for independent laboratories for testing

Independent laboratories for testing must fulfil the requirements according to 1.1.3 and have to work in accordance to the requirements of EN ISO 17020 and EN ISO 17025.

1.2.2.2.3 Requirements for independent experts working with laboratories

Independent experts working together with laboratories can form a third party body.

An independent expert can work with external laboratories, which either do not conform to 1.2.2.2.2 or do not have the necessary experience to perform adequate testing or he can work with a manufacturer's laboratory, where the independent expert insures adequacy of testing facilities and procedures as well as independency of the laboratory. In this case, only the independent expert can perform the tests and write the tests reports. The independent experts have to respect the requirements of EN ISO 17025 concerning testing.

1.2.2.3 Requirements for third parties for evaluation and assessment

1.2.2.3.1 General requirements

The evaluation work of the type testing can be undertaken only by independent experts (see 1.1.4), initial inspection of the plant and regular assessment of FPC can be undertaken by independent laboratories, by independent auditing bodies or by independent experts (see 1.1.3, 1.1.4 and 1.1.5), writing of the EQC assessment report can be undertaken only by independent laboratories or independent experts (see 1.1.3 and 1.1.4). Each independent laboratory has to appoint one or more of its employees as responsible for the EPAQ EQC. The Quality Committees have to confirm the appointments.

1.2.2.3.2 Requirements for independent laboratories for evaluation and assessment

Independent laboratories must fulfil the requirements according to 1.1.3.

1.2.2.3.3 Requirements for independent experts for evaluation and assessment

Independent experts for evaluation and assessment must fulfil the requirements according to 1.1.4.

Independent experts for fire must fulfil the requirements according to 1.1.4.2.

Independent experts for thermal characteristics must fulfil the requirements according to 1.1.4.3.

1.2.2.3.4 Requirements for independent auditing bodies for assessment

Independent auditing bodies for assessment must fulfil the requirements according to 1.1.5.

1.2.3 Requirements for independent experts in the Quality Committeesn

1.2.3.1 At least two independent experts are elected members of each Quality Committee. They have to be elected by the General Assembly (see Statutes, Article 9).

1.2.3.2 The independent experts of the Quality Committees have to be recognised for the following tasks:
- Type testing of mechanical and dimensional characteristics and writing the test report;
- Evaluation of the results of type testing of mechanical and dimensional characteristics and writing the evaluation report.

1.2.4 Technical requirements

1.2.4.1 Table 2.2 shows a list of properties for panels and table 3.1 for profiles, which are under control of the EPAQ scheme concerning the different applications.
Frequency of testing and the number of samples for FPC and external control are regulated in Table 2.4 for panels and in Tables 3.10 and 3.11 for profiles.
In case of:
- dimensional tolerances,
- mechanical resistance,
- durability, where required,
- thermal insulation performance,

the parties involved in the voluntary quality assurance system of the association have the following tasks (see Table 1.1 below):

Duty	Outcome	Party involved
Type testing	Test report	Third party according to 1.2.2.2
Evaluation of the type testing on mechanical and dimensional characteristics	Evaluation report	Third party according to 1.2.2.3.3
Checking of the evaluation of the type testing on mechanical and dimensional characteristics	Checking report	Third party according to 1.2.3
Evaluation of the type testing of λ - and calculation/checking of U-values	Assessment report for thermal characteristics	Third party according to 1.2.2.3.3
Initial inspection	Assessment report	Third party according to 1.2.2.3
Regular testing of samples within EQC	Test report, evaluation report and assessment report for EQC	Third party according to 1.2.2.2
Regular FPC assessment within EQC	FPC assessment report	Third party according to 1.2.2.3

Table 1.1: Tasks of involved parties concerning mechanical characteristics, dimensional characteristics, durability and thermal insulation performance

1.2.4.2 In case of:
- Reaction to fire
- Fire resistance, where required
- External fire performance, where required

the parties involved in the voluntary quality assurance system of the association have the following tasks (see Table 1.2 below):

Duty	Outcome	Party involved
Analysis of type testing data regarding fire performance	Assessment report for fire properties	Third party according to 1.2.2.3.3
Regular FPC assessment within EQC (in case of reaction to fire)	FPC assessment report	Third party according to 1.2.2.3

Table 1.2: Tasks of involved parties concerning fire performance

Test reports and classification reports are to be provided if no CWFT-decision exists.

1.2.4.3 In case of:
All other properties (e.g. tightness performance), the parties involved in the voluntary quality assurance system of the association have the following tasks (see Table 1.3 below):

Duty	Outcome	Party involved
Type testing	Test report	Third party according to 1.2.2.2
Evaluation of the type testing	Evaluation report	Third party according to 1.2.2.3.3

Table 1.3: Tasks of involved parties concerning other properties

1.2.5 Assessment and verification of product performance

In order to ensure that the performance is accurate and reliable, the performance of the product should be assessed and the production in the factory should be controlled in accordance with an appropriate system of assessment and verification of performance of the product. Under the EPAQ scheme, several systems have been established to be applied for panels and profiles, in order to take into account the specific relationship of some of its essential characteristics to the requirements of a good product quality (Table 1.4).

Tasks		EPAQ Systems				
		A	B	C	D	E
Manufacturer	Determination of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product			X		X
	Sampling for the type testing	X		X		X
	Factory Production Control	X	X	X	X	X
	Further testing of samples taken at the factory in accordance with the prescribed test plan	X	X	X		
Third party	Determination of the product-type on the basis of type testing, type calculation, tabulated values or descriptive documentation of the product	X	X		X	
	Sampling for the type testing		X		X	
	Initial inspection of the manufacturing plant and of factory production control	X	X	X		
	Continuous surveillance, assessment and evaluation of factory production control	X	X	X		
	Audit-testing of samples taken before placing the product on the market	X				

Table 1.4: EPAQ systems of assessment and verification of product performance

1.3 Procedural regulations for the award and use of the Quality Label EPAQ

1.3.1 Award of the Quality Label EPAQ

1.3.1.1 The applicant has to submit the "Application form for the award of the Quality Label EPAQ" to the secretariat of the "European Association for Panels and Profiles" with clear specification of the range of the products for which the Quality Label EPAQ is wished. The application has to be accompanied by a signed and legally binding certificate of undertaking.

1.3.1.2 The association awards, under contract, the right to use the Quality Label "European Panels and Profiles Assured Quality" (EPAQ) to manufacturers of panels and/or profiles that maintain the compliance with these Quality Regulations. The award of the quality label is only made, in a given instance, in respect of one specific group of products.

1.3.1.3 The Quality Regulations for Panels and Profiles are extended and further developed to match the technical progress made in this area.

1.3.1.4 The procedure that has to be followed to get a quality label is described below:

- The applicant informs the secretariat about its chosen third parties responsible for the different characteristics; which will be certified.
- For panels:
  - The third party for type testing of the mechanical and dimensional characteristics;
  - The independent expert for fire (at least, the reaction to fire has to be certified);
  - The independent expert for thermal characteristics
- For profiles:
  - The third party for type testing of the mechanical and dimensional characteristics;
  - The independent expert for fire (at least, the reaction to fire has to be certified).
- The third parties inform the applicant about the necessary tests and/or documents. It is recommended that the chosen third parties meet to correlate their work. The third parties are bound to secrecy in respect of third parties.
- Type testing and writing of test report on the mechanical and dimensional characteristics by a third party for testing (see 1.2.2.2).
- Evaluation of the type testing results, given in a separate evaluation report by an independent expert for evaluation (see 1.2.2.3.3). The reports are passed on to the applicant and to the secretariat of the association.
- Checking of the evaluation (including evaluation report and possibly test report) by an independent expert of the relevant Quality Committee (see 1.2.3). This independent expert must be different from the independent expert who has done the evaluation.
- The independent experts of the relevant Quality Committee can decide on additional independent experts for checking the evaluation reports.
- The independent expert for fire analyses the type testing data regarding the fire performance of the products and forwards the results of his analysis within the assessment report for fire properties to the secretariat of the association and to the chairman of the relevant Quality Committee.
- In case of panels, an independent laboratory for λ-testing carries out type testing of the thermal conductivity. This can be done in parallel with the type testing of the mechanical and dimensional characteristics. The independent expert for thermal characteristics analyses and confirms the λ-test reports, calculates or checks the calculation of the U-values and forwards the results of his analysis within the assessment report for thermal characteristics to the secretariat of the association and to the chairman of the Quality Committee for Panels.
- One of the above mentioned third parties involved in the certification process has to prepare a first draft Certification Document (CD) by by filling in the characteristics which were under its responsibility (mechanical and dimensional / fire / thermal) and has to send it to the secretariat. The secretariat has to forward the draft for completion to the other involved third parties.
- The secretariat of the association checks the CD filled by all involved third parties, including the consistency of the U-values in the CD with the U-values declared by manufacturer in brochures, technical

papers or via internet. Potential issues and deviations have to be cleared. The final form of the CD has to be signed by the chairman of the relevant Quality Committee. The CD has a validity period of six years. When the CD reaches the expiry date, the secretariat has to perform a formal check of the content, after which the CD can be renewed. For the renewal, the secretariat needs the confirmation of the third party responsible for the EQC, that the certified products have not been modified.

- If the results are negative, the relevant Quality Committee do not grant the application. The Committee must then provide reasons in writing for the rejection. In this case, the relevant Quality Committee can set a time for the execution of a repetition.
- The manufacturer has the possibility to file an objection to the decision of rejection. The manufacturer has to present arguments in favour of the award of the CD for his products on the next meeting of the relevant Quality Committee.
- Initial inspection, which includes plant inspection and FPC assessment, by a third party for evaluation and assessment, finalized with issuance of the assessment report. In case of already approved systems, confirmed by the relevant Quality Committee, this inspection is not obligatory.
- If an applicant has two or more plants, which manufacture exactly the same products, a CD has to be issued for each production plant, but with the same content. The group company has to ensure within a written statement that the products of these production lines of its plants are exactly the same. This statement and the relevant production processes and documentation have to be checked on-site by the third party responsible for initial inspection.
- After the award of the CD, the manufacturer has to conclude a contract for the EQC with a third party.
- After the first EQC, if the requirements were fulfilled (with or without comments) and the EQC assessment report is issued by the responsible third party, the Quality Certificate will be awarded to the manufacturer.
- The costs of the tests and the auditing are borne by the applicant.
- The Quality Certificate signed by the Secretary General of the association and by the chairman of the relevant Quality Committee is awarded to the applicant, which can start using the Quality Label EPAQ for the certified products.

1.3.2 Marking of products for which the Quality Label EPAQ has been awarded

In general, the manufacturers are obliged to affix the Quality Label EPAQ to the package of those product types for which the Quality Label EPAQ has been awarded. The Quality Label EPAQ shall be used only in combination with the certification number.

Regarding sandwich panels, the manufacturers are obliged to mark during production those panel types for which the Quality Label EPAQ has been awarded. The marking has to be done on the inner face of the panels, using ink that is only visible under ultraviolet light. Each panel produced has to bear at least one marking. The marking shall contain the following elements (see Figure 1.1 and Figure 1.2 below):

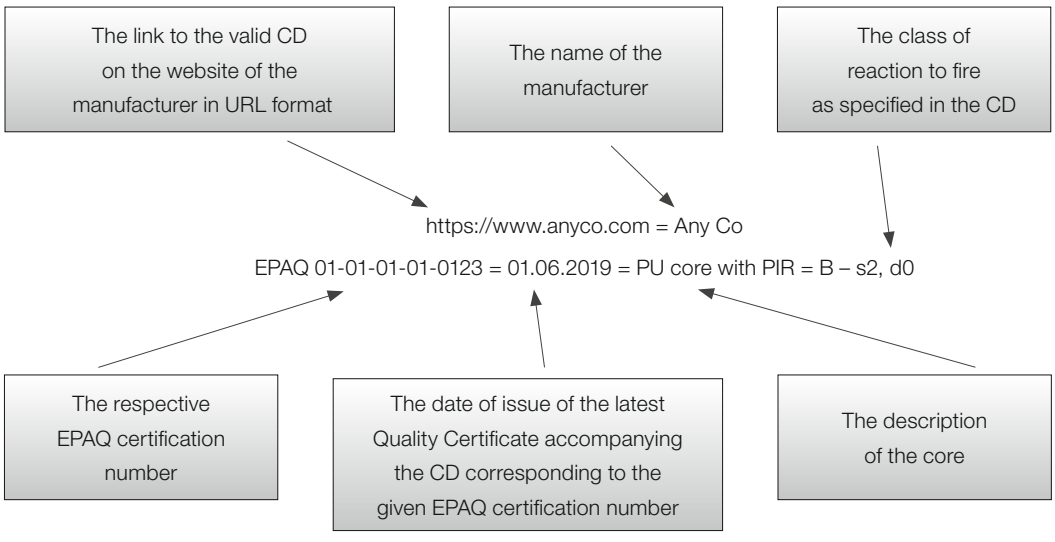


Figure 1.1: Example of marking on panel inner face (mandatory information)

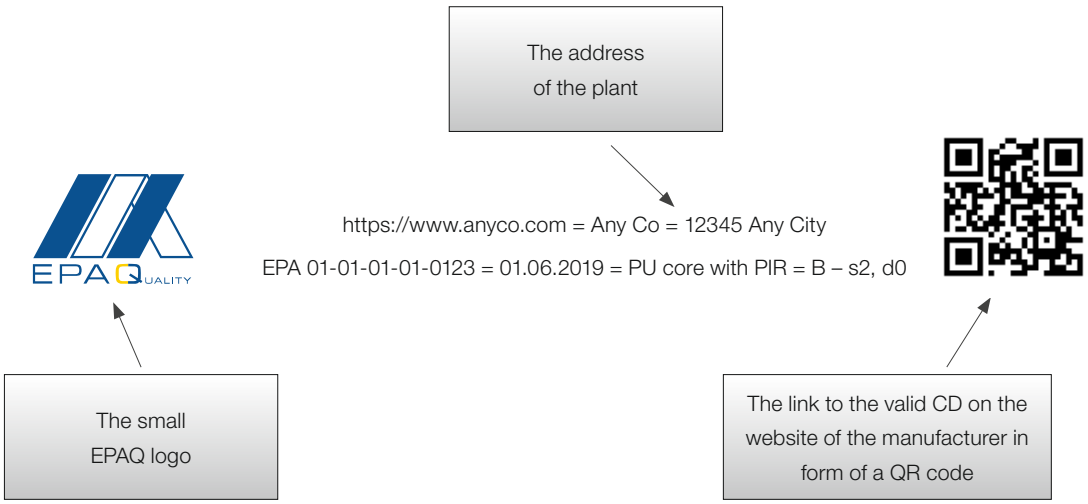


Figure 1.2: Example of marking on panel inner face (optional information)

If the direct marking on the inner face is not possible due to the protection foil, the nature of coating or due to the control system on the production line, all the information mentioned above have to be provided for each panel type on a sticker, which shall be applied by the installer on the panel after the building is erected. The sticker shall be put on an easily accessible place close to the building main entrance or on another suitable place in the building. It is recommended to use at least one sticker for each 1000 m^2 installed panels.

1	The small EPAQ logo		
2	The respective EPAQ certification number	e.g. 01-01-01-01-0123	
3	The date of issue of the latest Quality Certificate accompanying the CD corresponding to the EPAQ certification number given in (2)	e.g. 01.06.2019	
4	The description of the core	e.g. PU core with PUR or PIR, MW core with stone or glass wool	
5	The class of reaction to fire as specified in the CD	e.g. B - s2, d0	
6	The name of the manufacturer and the address of the plant	e.g. Any Co e.g. 12345 Any City	
7	The link to the valid CD on the website of the manufacturer in URL format and in form of a QR code	https://www.anyco.com	

Table 1.5: Content of the information sheet for EPAQ certified panels

1.3.3 Use of the Quality Label EPAQ

1.3.3.1 Quality label users may only use the quality label for products which comply with these Quality Regulations and for which the quality label has been awarded.

1.3.3.2 The owners of the Quality Label EPAQ shall only use the quality label in combination with a certification number.

1.3.3.3 The “European Association for Panels and Profiles” alone has the right to allow a means of identification of the quality label to be produced and supplied to the user of the quality label or to allow the label to be handed out and the use of it to be set out in more detail.

1.3.3.4 The Managing Committee may issue special rules for the use of the quality label in advertising, so that the integrity of competition is preserved and misuse is prevented. Individual advertising must not be hampered by this, although the same maxim regarding the integrity of competition still applies.

1.3.3.5 If the right to use the quality label is withdrawn, the Certification Document and the Quality Certificate have to be returned. The same applies if the right to use the label has expired for any other reason.

1.3.3.6 Panels and profiles according to these Quality Regulations are covered by harmonised standards. Information in any form about their performances in relation to the essential characteristics, as defined in the applicable harmonised technical specification, may be provided only if included and specified in the Declaration of Performance. Information in any form about their performances in relation to these Quality Regulations, as defined in these Quality Regulations, may be provided only if included and specified in the Certification Document of the EPAQ scheme. Product information of the manufacturer via Internet, brochures, technical papers, etc. shall contain the same values of performance as specified in the Declaration of Performance and in the Certification Document, unless clearly specified by specific regulations in the member states.

1.3.3.7 A quality label can be withdrawn in case of publication of performances which do not conform to the provisions in 1.3.2.6.

1.3.4 Control of the Quality Label EPAQ

1.3.4.1 The “European Association for Panels and Profiles” is justified and is required to control the use of the quality label and the maintenance of the quality regulations.

1.3.4.2 Every quality label user has to undertake the necessary provisions to make sure that the quality regulations are adhered to.

1.3.4.3 Further, he must submit his products, insofar as a quality label exists for them, to a third party. This is done by a laboratory arranged by the association (audit testing). The costs that arise for this are borne by the quality label user.

1.3.4.4 If a test proves to be negative or a quality-controlled product is rejected, the relevant Quality Committee arranges for the test to be repeated. The quality label user can likewise demand a repeat test to be undertaken.

1.3.4.5 A test report is to be issued by the appointed tester for each test result. The association and the quality label user each obtain a copy.

1.3.4.6 If quality controlled products are unjustifiably rejected, then the organisation that has rejected them bears the cost of the test; if they have been justifiably rejected, then the respective quality label user bears the cost.

1.3.5 Penalties for deficiencies

1.3.5.1 If deficiencies in the quality control are established by the relevant Quality Committee, it will propose penalties to the Managing Committee of the "European Association for Panels and Profiles". These depend on the severity of the deficiency:

- Additional requirements in the context of FPC
- Increase in audit testing
- Warning
- Contractual penalty in a sum of up to € 5,000,
- Time-limited or permanent withdrawal of the label.

1.3.5.2 The measures stated under section 1.3.4.1 can be linked together.

1.3.5.3 The party concerned is to be given a hearing in all cases.

1.3.5.4 In urgent cases, the President of the "European Association for Panels and Profiles" can provisionally withdraw the quality label with immediate effect. This must be confirmed within 14 days by the Managing Committee of the "European Association for Panels and Profiles".

1.3.6 Complaints

1.3.6.1 Quality label users can appeal to the relevant Quality Committee against penalty decisions within 4 weeks of their issue.

1.3.6.2 The appeal must be replied in the next scheduled meeting of the relevant Quality Committee under condition it arrives 4 weeks before this meeting.

1.3.6.3 The appeal must be replied in the next scheduled meeting of the relevant Quality Committee under condition it arrives 4 weeks before this meeting.

1.3.7 Re-award

If the right to use the label is withdrawn, the right to the use of the label can be reinstated following a successful re-examination. The procedure is in accordance with these Quality Regulations. The board on proposal of the relevant Quality Committee of the "European Association for Panels and Profiles" can, however, impose additional conditions.

1.4 Content of the Certification Document

	CONTENT	PANELS	PROFILES
FRONT PAGE	Manufacturer (name and address)	X	X
	Production plant	X	X
	Panel/Profile Types Note: In case of panels, the criteria upon which products can be organized in relevant families to be part of the same CD, are: - The category of the core material (PUR, MW, EPS etc.); - The face material (e.g. steel, aluminium); - The plant, if there are different plants producing the same product.	X	X
	Date of issuing	X	X
	Date of expiry	X	X
	Certification Number(s) – The Quality Label EPAQ shall be used only in combination with this certification number(s).	X	X
	Number of pages contained	X	X
	Rule for awarding the Quality Certificate and the Quality Label EPAQ: "This Certification Document is only valid in combination with the valid accompanying Quality Certificate. The Quality Certificate is awarded only after the first external quality control, if the requirements of this Certification Document are fulfilled."	X	X
	General	X	X
	Panel/Profile types and definition of used materials Note: In case of profiles, the manufacturer has to state which profiles are intended for roof applications, because the test for determination of resistance to concentrated forces is necessary for roof products only.	X	X
	Panel/Profile types	X	X
	Characteristics and composition	X	X
	Facings Notes: – the metallic coating does not have to be mentioned; - used tolerances (e.g. for steel, normal or special tolerances, accor ding to EN 10143); - the relevant standard for the used coating (e.g. organic coating ac-cording to EN 10169)	X	
	Sheets (Steel, Aluminium etc.)		X

Table 1.6: Content of the Certification Document

	CONTENT	PANELS	PROFILES
	Core material Notes: – the same name of the foam dispensing as the one specified in the fire test report(s), in the test report for mechanical properties and in the test report for thermal characteristics shall be used in the CD	X	
	Corrosion protection system		X
	Adhesive Note: – the same name of the adhesive as the one specified in the fire test report(s) and in the test report for mechanical properties shall be used in the CD	X	
Declared characteristic values shall be given to either two or three significant figures	Material safety factors and wrinkling stresses (see below table 4 to table 6)	X	
	Resistance to concentrated forces		X
	Reaction to fire - the reaction to fire class according to the Classification Report shall be mentioned (e.g. at least class C-s3,d0)	X	X
	Fire resistance, if indicated	X	X
	External fire performance, if indicated	X	X
	Durability, if indicated	X	X
	Water permeability, if indicated	X	X
	Air permeability, if indicated	X	X
	Water vapour permeability, if indicated	X	X
	Airborne sound permeability, if indicated	X	
	Sound absorption, if indicated	X	
	Walkability, if indicated	X	
	Table 1: Thermal transmittance U-values (W/m^2K)	X	
	Table 2: Requirements for the production control of the core material with faces (mechanical values)	X	
	Table 3: Long term shear values	X	
	Table 4: Material safety factors γ_M for panels	X	
	Table 5: Wrinkling stresses (MPa) for external faces	X	
	Table 6: Wrinkling stresses (MPa) for internal faces	X	
	Information about how to interpolate between different thicknesses of the panels	X	
	Drawings	X	X
	Signature of the chairman of the relevant Quality Committee	X	X

Table 1.6 (continued): Content of the Certification Document

2 QUALITY REGULATIONS FOR PANELS

2.1 Requirements for the properties

2.1.1 Tensile strength of the panel

The threshold value of the tensile strength of the panel is defined to:

– PUR/PIR, EPS/XPS: ≥ 0,06 MPa as a characteristic value (5 %-fractile)
– For other core materials: ≥ 0,03 MPa as a characteristic value (5 %-fractile)

Note: The values are defined by reason of the different handling of durability testing. Known PUR/PIR, EPS/XPS shall be considered to satisfy the durability requirements without testing (for EPS/XPS only DUR 1 required), see EN 14509. Besides, there is currently no experience for these core materials with tensile strength less than 0,06 MPa. For other core materials, durability testing is always required.

2.1.2 Compressive strength of the insulating core of the panel

The threshold value of the compressive strength of the insulating core of the panel is defined to:

– PUR/PIR: ≥ 0,07 MPa as a characteristic value (5 %-fractile)

2.1.3 Reaction to fire

Panels must have a minimum class of reaction to fire behaviour of C-s3,d0 and must have a certificate of constancy of performance.

All types of core material of the panel, except MW, shall be tested according to EN ISO 11925-2 on the naked core with the result “pass” for the 30s exposure. Panels that do not pass this requirement cannot receive the Quality Label EPAQ.

2.2 Control of the properties

2.2.1 General

The third party has to check the components and their ratios of the foam in case of foamed panels. Third parties can compare the FPC records with the results of type testing. For the expertise and the regular checking, the third parties need the code name of the foam and the names of all components. The manufacturers of foamed panels are obliged to provide the ratios of the components of the chemical system(s) in a statement document that is also signed by the EPAQ third party which performs the sampling for the certification phase. This document is confidential and therefore will be only available at the producer and has to be checked during the continuous surveillance by the TP responsible for EQC.

2.2.2 Base material

If the finished product manufacturer buys base materials whose characteristics have already been determined in accordance with the provisions of the hENs, listed in the scope of these regulations and are declared by the base material supplier with an inspection certificate 3.1 according to EN 10204 for every batch, the finished product manufacturer‘s system requires only a document check to ensure that the characteristics meet the product manufacturer‘s specifications, provided that the production process for the finished product does not change in an unfavourable way these characteristics.

A batch is defined in the respective product standard (e.g. EN 10346) and the batch has to be produced in the same production run.

The inspection certificate 3.1 shall contain the following data:

– Name of the coil coater / producer
– Coil no. or coil batch number

- Width of coil
- Indication of the type and grade of material
- Indication of the nominal layer weight of the metallic protective layers in accordance with EN 10346 or of other certified layers
- Format and nominal sheet thickness (t_N) (in mm respectively)
- Tolerances (normal or special)
- Coating system
- Weight of the metal protective layer (g/m²) determined in accordance with EN 10346
- Determined thickness of the organic coating visible side/rear side in µm
- Determined values of the mechanical material properties (see also EN 10346 for steel or EN 485-2 for aluminium)
- Yield strength or 0,2 %-proof strength ($R_{eH}/R_{p0,2}$) in MPa
- Tensile strength (R_m) in MPa
- Elongation A_{80mm}/A_{50mm} according to the technical specifications, in %
- Zinc adhesion, required for metallized, organic coated steel for cold forming.

Otherwise, the material cannot be used for production and has to be rejected

In case of not having an inspection certificate 3.1, all data mentioned above have to be determined by the manufacturer himself.

In case of an incomplete inspection certificate, not containing all data mentioned above, the missing data has to be determined by the manufacturer himself.

2.2.3 Type testing

2.2.3.1 General

All characteristics in EN 14509, where relevant, shall be subjected to type testing with the exception of fire performance when using the CWFT option, where measurement in accordance with EN 14509 is required to ensure that the product meets the definition required for CWFT.

Interpolation of characteristic values is permitted between different panel thicknesses (e.g. 60 mm / 120 mm / 200 mm).

Families:

For certification under the EPAQ scheme, the evaluation can be done according to EN 14509. The definition of families is under responsibility of the expert of the association.

2.2.3.2 Additional requirements of the EPAQ scheme

Several properties are subjected to type testing with additional requirements of the European Association for Panels and Profiles, see 2.1, 2.2.6 and Table 2.3.

2.2.3.3 Responsibility

The type testing must be done by third parties for testing according to 1.2.2.2. The evaluation and preparation of the evaluation report must be done by third parties for evaluation and assessment according to 1.2.2.3.

2.2.3.4 Type testing

The type testing of mechanical and dimensional characteristics can be done in a laboratory or in a factory of the manufacturer. The presence of an independent representative of a third party is absolutely necessary for calibration and supervision of the tests.

2.2.4 Initial Inspection and External Quality Control

2.2.4.1 General

When an initial inspection is necessary, it shall be conducted prior to the first EQC. During the initial inspection, the responsible third party has to inspect the production equipment, the storerooms for raw materials including the tanks for chemicals and the FPC of the manufacturer including the laboratory.

The regular inspection including audit-testing of samples is carried out at least twice a year in the factory of the quality label user based on the control agreement.

2.2.4.2 Responsibility

The initial inspection must be done by third parties for evaluation and assessment according to 1.2.2.3 and the EQC tests must be done by third parties for testing according to 1.2.2.2.

2.2.4.3 Procedures

The EQC needs to be conducted in accordance with the testing regime described in Table 2.4. Sampling and testing have to be done by a third party or can be done by the manufacturer in the presence and under the responsibility of a third party.

- Per date of EQC and certification document, samples of one panel type (one combination of face geometry, one core type and one panel thickness) shall be taken out of running production by the third party. The taken panel types shall be varied in the course of time, to cover the range of production (including also roofs and walls, if relevant) and scope of the certification document.
- An EQC of one manufacturer can be valid for both main applications (walls and roofs), for all types of face geometries, for all types of core material within the PU category or MW category, even though there are different certification documents. For each core category (e.g. PU, MW), an EQC has to be conducted.
- The panels for controlling should be taken out of the running production by the third party.

If third parties observe that certified products were not produced during the whole 3 year period of validity, they have to report these types of problems to the Quality Committee for Panels.

In each panel production plant, the internal FPC must be checked during EQC at least twice a year for all Certification Documents. The responsible third party shall be physically present in the plant twice a year. The manufacturer has to put at disposal of the third party all the individual values of its FPC.

The results of the external control are recorded in the test report, in the evaluation report and in the assessment report for EQC of the third party. The manufacturer and the secretariat of the association simultaneously receive one copy of the reports.

Checking of the evaluation of the results within EQC is a task of the Quality Committee for Panels.

In case of inadequate test results within the framework of the external control, the responsible third party must request the manufacturer to adopt appropriate measures to correct the deviations found. If the deviations are not corrected within the agreed time period, then the third party must inform the Quality Committee for Panels, which has to decide upon further actions.

The time period within which the manufacturers shall react and report differs based on the severity of the deviations:

- Six months or until the following EQC, in cases of marginal deviations, which do not affect the effectiveness of the FPC, respectively the product quality or which could even show a higher quality, although the EQC measurements are outside of the tolerances given in the CD;
- Two months, in cases of deviations of medium severity, which affect the product quality only on characteristics of less importance so that there is no direct implication on the quality of the product or which affect the effectiveness of the FPC in such a way, that the general function and efficiency still exist;

– Immediately, in cases of severe deviations, which affect considerably the effectiveness of the FPC and/or the product quality on major characteristics. In these cases, the secretariat of PPA-Europe and the Quality Committee for Panels have to be informed immediately as to discuss the withdrawal of the EPAQ Quality Certificate.

In cases of severe deviations and deviations of medium severity, the responsible third party must check whether the manufacturer has solved the non-conformities or not and the outcome of the measures adopted by the manufacturer shall be included in the EQC reports. The EQC results then shall be either "requirements fulfilled" or "requirements not fulfilled".

The check by the responsible third party of the measures to correct marginal deviations can be performed during the next EQC. An extra visit in beforehand is not demandable. The outcome of the measures to correct marginal deviations can be included into the EQC reports or can be handled in a separate report. After checking the outcome, the initial EQC results „requirements fulfilled with comments" can be either kept or converted into „requirements fulfilled".

When the outcome of two consecutive external quality controls is negative (the requirements of the CD are not fulfilled), the certification is cancelled and the Quality Label EPAQ is withdrawn.

2.2.4.4 Evaluation of test results for mechanical properties
No individual test result in EQC shall be less than the value declared. Otherwise, additional samples need to be taken, tested and the 5 %-fractile value needs to be determined anew. The resulting characteristic value shall not be less than the declared value. Otherwise, the panel loses conformity with the quality label. For the anew determination of the 5%-fractile value, it may be assumed that k = 1,65.

2.2.4.5 Evaluation of test results for other properties
No individual test result in EQC shall be less than the value declared. Otherwise, additional samples need to be tested.

2.2.4.6 Thermal insulation performance
The control of the thermal insulation performance has to be performed with respect to 2.2.6. In case of prefabricated core materials, the control can also be the task of the manufacturer of the core material.

2.2.5 FPC procedures

2.2.5.1 General
The manufacturer shall establish procedures to ensure that the stated values of all of the characteristics are maintained in accordance with EN 14509. Table 2.4 shows the test methods which must be used for FPC and external control, the number of specimens and the frequency of FPC and external control.

2.2.5.2 FPC for safety in fire characteristics
FPC for safety in fire characteristics shall be carried out according to EN 14509.

2.2.6 Type testing, EQC and FPC procedures for the thermal characteristics

2.2.6.1 Determination of the thermal conductivity based on EN 14509
The declared thermal conductivity ($\lambda_{Declared}$) shall be determined in accordance with the procedures described in the appropriate product standard for the core material in the direction used for insulation in the sandwich panel. For preformed CE-marked mineral wool core materials, the values and the results from the manufacturer of the core material can be used without any further testing, if the manufacturer has a quality system that respects the requirements of EN 13172, the CE markings provide the λ values for the orientation used in the panel manufacturing process and these core material performances are controlled under responsibility of a third party, in a system equivalent with the AVCP system 1+. Nevertheless, an external third party control for panels must be done. Test reports issued for the purpose of the ACERMI admission phase are accepted if they meet the EPAQ requirements.

For other materials than core materials (e.g. metal sheets), tabulated values in accordance with EN 10456 shall be used.

The declared thermal conductivity ($\lambda_{Declared}$) shall be determined. In case of aged values, $\lambda_{Declared}$ is equal to λ_{Design}. In order to grant comparability all over Europe, the EPAQ certification does not take into account additional national safety factors. These factors have to be taken into account for the national documents. Afterwards, the thermal transmittance value (U_{ds}) for the panel system excluding the transversal joints, but taking into account the effects of the longitudinal joints, shall be calculated according to EN 14509.

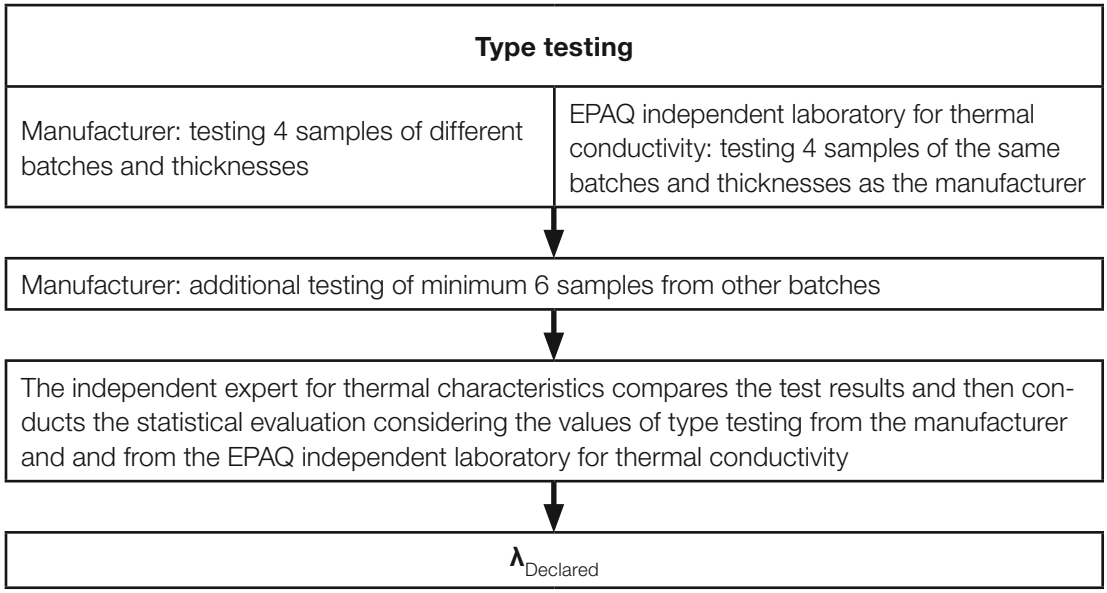


Figure 2.1. Flow chart of thermal conductivity determination

2.2.6.2 Procedures for panels with PUR core

2.2.6.2.1 General

The panel manufacturers can choose between two procedures for taking into account the effect of aging: the fixed increment procedure and the accelerated aging procedure. In case of the accelerated aging procedure, two methods are possible according to EN 13165: to use initial lambda values and aging increments (aging increment method) or to use aged lambda values (direct aging method). For core materials with CO_2 as blowing agent, additional requirements have to be respected.

2.2.6.2.2 Type testing

2.2.6.2.2.1 Cell-gas composition and closed cell content

The following two characteristics have to be determined on at least one sample by an EPAQ independent laboratory for thermal conductivity in order to confirm the used blowing agent:

- Cell-gas composition
- Closed cell content in accordance with EN 13165:2016, C.5.1, determined according to EN ISO 4590. The closed cell content shall not be less than 90 %.

2.2.6.2.2.2 Initial λ-testing in case of fixed increment procedure and aging increment method

- Initial λ-test according to EN 13165:2016, C.3: 4 tests (1 test / panel type) on samples without cover sheets and in complete core thickness, from different batches and thicknesses by agreement with

an EPAQ independent expert for thermal characteristics, have to be tested in the same time by the manufacturer and by an accepted laboratory from the list of EPAQ independent laboratories for thermal conductivity. The manufacturer has to manage the coordination of the parallel testing. In order to cover the production range, the thickness and source of samples shall be varied (at least one thickness from the small range and one from the big range of thicknesses; one sample from a panel with profiled faces and one from a panel with flat or quasi flat faces, if applicable).

- The independent expert for thermal characteristics has to compare the initial 4 λ-values of the manufacturer and of the EPAQ independent laboratory. The difference between these values shall be within the tolerances given in Table 2.1.
- The manufacturer has to perform 6 more λ-tests on different batches.

2.2.6.2.2.3 Normality test in case of fixed increment procedure

- 4 specimens 20 mm thick cut out from the centre of the same 4 initially tested samples have to be tested according to EN 13165:2016, C.5.2, after aging 21 days at 70°C (2 specimens by the manufacturer and 2 specimens by the EPAQ independent laboratory). The manufacturer and the laboratory have to agree on the thicknesses that each of them shall test in order to cover the 4 thicknesses initially tested.
- In case the normality test cannot be performed on the same 4 initially tested samples, other 4 samples can be tested (at least one thickness from the small range and one from the big range of thicknesses).
- The λ-values of the initial test and of the normality test have to be compared by an independent expert for thermal characteristics. If the difference of all 4 single λ-values is lower than 6mW/(m*K), the "fixed increment" can be applied. Otherwise, the aging increment method has to be followed.

2.2.6.2.2.4 Accelerated aging procedure

The accelerated aged value of thermal conductivity shall be determined as follows:

- Measure the accelerated aged value in accordance with EN 13165:2016, C.4.2;
- Add safety increment in accordance with EN 13165:2016, C.4.3, Table C.1.

2.2.6.2.2.4.1 Aging increment method

- Accelerated aging test: 4 samples have to be tested after aging 175 days at 70°C (2 samples by the manufacturer and 2 samples by the EPAQ independent laboratory). The manufacturer and the laboratory have to agree on the thicknesses that each of them shall test in order to cover the 4 thicknesses initially tested.

2.2.6.2.2.4.2 Direct aging method

- Accelerated aging test: 4 samples without cover sheets and in complete core thickness, from different batches and thicknesses by agreement with an EPAQ independent expert for thermal characteristics, have to be tested in the same time by the manufacturer and by an accepted laboratory from the list of EPAQ independent laboratories for thermal conductivity, after aging 175 days at 70°C. The manufacturer has to manage the coordination of the parallel testing. In order to cover the production range, the thickness and source of samples shall be varied (at least one thickness from the small range and one from the big range of thicknesses; one sample from a panel with profiled faces and one from a panel with flat or quasi flat faces, if applicable).
- The independent expert for thermal characteristics has to compare the 4 λ-values of the manufacturer and of the EPAQ independent laboratory. The difference between these values shall be within the tolerances given in Table 2.1.
- The manufacturer has to perform 6 more accelerated aging tests on different batches.

2.2.6.2.2.5 Evaluation of the test results by an independent expert for thermal characteristics

Basics:

- Statistical evaluation delivers $\lambda_{90/90}$
- Rounding rules: $\lambda_{Declared}$

2.2.6.2.2.5.1 Fixed increment procedure $\lambda_{90/90}$

For calculating $\lambda_{90/90}$, at least 10 initial values of thermal conductivity are needed, whereby, finally, the fixed increment $\Delta\lambda_f$ according to EN 13165:2016, C.5, Table C.2 has to be included for calculating the lambda declared value according to C.5.2 in conjunction with C.6.3 “Initial values of thermal conductivity used to calculate the $\lambda_{90/90}$ value” and Formula C.2 in EN 13165:2016.

$\lambda_{90/90} = \lambda_{mean,i} + k_i \times s_{\lambda,i} + \Delta\lambda_f$ (Formula C.2)

$\lambda_{mean,i}$ = mean value of the initial lambda values

k_i = correction factor according to EN 13165:2016, A.3.3, Table A.1

$s_{\lambda,i}$ = standard deviation

$\Delta\lambda_f$ = fixed increment according to C.5, Table C.2.

2.2.6.2.2.5.2 Accelerated aging procedure $\lambda_{90/90}$

2.2.6.2.2.5.2.1 Using for calculation the initial values of thermal conductivity

This first way of calculation is according to C.4.2 in conjunction with C.6.3 “Initial values of thermal conductivity used to calculate the $\lambda_{90/90}$ value” and Formula C.1 in EN 13165:2016.

At least 10 initial values in accordance with C.3 and the mean value of 4 measured accelerated aged values in accordance with C.4 with the safety increment according to C.4, Table C.1 in EN 13165:2016 are needed. The difference between the measured aged value in accordance with C.4 and the measured initial value results in the aging increment $\Delta\lambda_a$.

$\lambda_{90/90} = \lambda_{mean,i} + k_i \times s_{\lambda,i} + \Delta\lambda_a$ (Formula C.1)

$\lambda_{mean,i}$ = mean value of at least 10 initial lambda values

k_i = correction factor according to EN 13165:2016, A.3.3, Table A.1

$s_{\lambda,i}$ = standard deviation

$\Delta\lambda_a$ = difference between the mean value of the accelerated aged values of the manufacturer (2 values) and of the EPAQ independent laboratory (2 values) with the safety increment and the mean value of the initial lambda values of the manufacturer (4 values) and of the EPAQ independent laboratory (4 values)

$\Delta\lambda_a = (\lambda_{mean,a} + \Delta\lambda_s) - \lambda_{mean,i}$

$\lambda_{mean,a}$ = mean value of the accelerated aged lambda values

$\Delta\lambda_s$ = safety increment in accordance with EN 13165:2016, C.4.3, Table C.1

$\lambda_{mean,i}$ = mean value of initial lambda values of the manufacturer (4) and of the EPAQ independent laboratory (4)

2.2.6.2.2.5.2.2 Using for calculation the accelerated aged values of thermal conductivity

The second way of calculation is according to C.4.2 in conjunction with C.6.4 “Aged values of thermal conductivity used to calculate the $\lambda_{90/90}$ value” and Formula C.4 in EN 13165:2016.

At least 10 accelerated aged values in accordance with C.4 together with the safety increment according to C.4, Table C.1 in EN 13165:2016 are needed.

$\lambda_{90/90} = (\lambda_{mean,a} + \Delta\lambda_s) + k_a \times s_{\lambda,a}$ (Formula C.4)

$\lambda_{mean,a}$ = mean value of the accelerated aged lambda values

$\Delta\lambda_s$ = safety increment in accordance with EN 13165:2016, C.4.3, Table C.1.

k_a = correction factor according to EN 13165:2016, A.3.3, Table A.1

$s_{\lambda,a}$ = standard deviation

The obtained $\lambda_{Declared}$ value has to be used by the independent expert to calculate the U-values ($U_{d,s}$) for the CD and the threshold values for the FPC.

2.2.6.2.3 Further running production

The manufacturer has to collect and document all results from his FPC (a λ-test minimum once a month with possibility to test more). The single test results with the aging and safety increment (where applicable) should be below the declared value, but the results have to be added to the statistical evaluation to control that the newly calculated values of the thermal conductivity ($\lambda_{Declared\_new}$) are below or equal to the values of the type testing that are used for declaration on the CE-marking and for calculating the U-values (U_{ds}).

The manufacturer has to perform the normality test or the accelerated aging test (depending on the procedure used for the type testing of lambda) on one sample, which is identified as the worst-case in a product group (the thickness for which the worst result during type testing has been obtained, most likely the thinnest product), once at every 2 years. The requirements have to be fulfilled.

During each EQC according to the Quality Regulations, a panel has to be taken out of the production and the thermal conductivity has to be tested by an EPAQ independent laboratory. The single test results with the aging increment and safety increment (where applicable) have to be below or equal to the declared value, otherwise, the reason for the deviation has to be cleared and the tests have to be repeated or the declared values have to be changed. Furthermore, the results have to be added to the statistical evaluation to control that the newly calculated values of the thermal conductivity ($\lambda_{Declared\_new}$) are below or equal to the values of the type testing that are used for declaration on the CE-marking and for calculating the U-values (U_{ds}).

If the test results of the manufacturer and/or the EPAQ independent laboratory show permanent deviation from the declared thermal conductivity, the declared values as well as the U-values (U_{ds}) have to be adjusted in the CD by an independent expert for thermal conductivity.

2.2.6.3 Procedures for panels with MW or EPS core

2.2.6.3.1 Type testing

2.2.6.3.1.1 Testing

– 4 samples without cover sheets, 50 mm thick or thicker (20 mm thick in case 50 mm is not applicable for the manufacturer), cut out of the centre of panels from different batches and thicknesses by agreement with an EPAQ independent expert for thermal characteristics or lamellas taken out before bonding with the sheets, have to be tested in the same time by the manufacturer and by an accepted laboratory from the list of EPAQ independent laboratories for thermal conductivity. The

manufacturer has to manage the coordination of the parallel testing. Samples from MW slabs must be cut in such way so that they correspond to lamellas; the cutting direction (line direction or transversal direction) has to be noticed, because thermal conductivity is different.

– The independent expert for thermal characteristics has to compare the 4 λ-values of the manufacturer and of the EPAQ independent laboratory. The difference between these values shall be within the tolerances given in Table 2.1.
– The manufacturer has to perform 6 more λ-tests on different batches.

2.2.6.3.1.2 Evaluation of the test results by an independent expert for thermal characteristics

– Statistical evaluation delivers $\lambda_{90/90}$
– Rounding rules: λ Declared $\lambda_{Declared}$

2.2.6.3.1.3 Number of tests

4 samples of different batches and thicknesses have to be tested by the manufacturer. Simultaneously another 4 samples of the same 4 batches and thicknesses have to be tested by an accepted laboratory from the list of EPAQ independent laboratories for thermal conductivity. The manufacturer has to test another 6 samples from different batches to complete the 10 results for the type testing. The independent expert has to control that the results of the manufacturer and the results of the EPAQ independent laboratory are equal. Otherwise, the reason for the different results has to be eliminated and the tests may have to be repeated. Afterwards, the independent expert has to determine the declared value of the thermal conductivity ($\lambda_{Declared}$).

These values have to be used by the independent expert to calculate the U-values (U_{ds}) for the CD and the threshold values for the FPC.

In case the tests for thermal conductivity are performed by the manufacturer of the MW core material, the latest one has to be involved in the basic testing and has also to test 4 samples of the same batches as the EPAQ independent laboratory and as or instead of the panel manufacturer. The manufacturer of the MW core material has to follow the regulation of EN 13172.

2.2.6.3.2 Further running production

The panel manufacturer has to collect and document all results from his FPC (a λ-test minimum once a month with possibility to test more). The single test results should be below the declared value, but the results have to be added to the statistical evaluation to control that the newly calculated values of the thermal conductivity ($\lambda_{Declared\_new}$) are below or equal to the values of the type testing that are used for declaration on the CE-marking and for calculating the U-values (U_{ds}).

During each EQC according to the Quality Regulations, a panel has to be taken out of the production and the thermal conductivity has to be tested by an EPAQ independent laboratory. The single test results have to be below the declared value, otherwise, the reason for the deviation has to be cleared and the tests have to be repeated or the declared values have to be changed. Furthermore, the results have to be added to the statistical evaluation to control that the newly calculated values of the thermal conductivity ($\lambda_{Declared\_new}$) are below or equal to the values of the type testing that are used for declaration on the CE-marking and for calculating the U-values (U_{ds}).

If the test results of the manufacturer and/or the EPAQ independent laboratory show permanent deviation from the declared thermal conductivity, the declared values as well as the U-values (U_{ds}) have to be adjusted in the CD by an independent expert for thermal characteristics.

Core material	Type of production	single- / mean-λ-values	Maximum deviation allowed (%)
MW	continuous	s	7,5
		m	5
PUR	continuous	s	5
		m	3
	discontinuous	s	7,5
		m	5
Others	discontinuous	s	5
		m	3

Table 2.1: Maximum deviation allowed between λ-values obtained by the manufacturer and by the EPAQ independent laboratory

2.2.7 Procedure for certification of the type testing data for reaction to fire

- For the panel types for which the Quality Label EPAQ is wished, the manufacturer needs to own test reports, classification reports and certificate of constancy of performance for reaction to fire, issued by relevant European notified bodies. If the manufacturer does not own a certificate of constancy of performance, a contract has to be concluded with a notified product certification body for the initial inspection, issuance of the certificate and continuous surveillance. If the contracted notified product certification body is also an EPAQ third party with recognition for the task of initial inspection, the initial inspection for the purpose of the certificate of constancy of performance can be combined with the one for the purpose of EPAQ certification.
- The independent expert for fire contracted by the applicant checks the available type testing data regarding reaction to fire of the manufacturer. New or additional reaction to fire tests might need to be carried out. Therefore, the manufacturer has to choose a notified testing institute. The independent expert has to confirm the testing programme of the notified testing institute or notified product certification body.
- The notified testing institute, notified product certification body or an EPAQ third party accepted by the notified product certification body has to perform the sampling for type testing. The EPAQ Sampling Procedures for reaction to fire have to be considered.
- The EPAQ Testing Rules for reaction to fire, including provisions for the content of reports and certificates, have to be complied with.
- Following a positive outcome of data checking, the independent expert issues the Assessment Report for Fire Properties and forwards it to the secretariat of the association and to the chairman of the Quality Committee for Panels. The independent expert also fills in the information regarding the reaction to fire performance in the draft EPAQ Certification Document.

2.3 Additional information for panels

2.3.1. Necessary mechanical and physical characteristics

No.	Type of test	External walls	Internal walls	Cei-lings	Roofs
1	Density of core material	yes	yes	yes	yes
2	Cross-panel tensile strength (with faces)	yes	yes	yes	yes
3	Thickness of core	yes	yes	yes	yes
4	Mass of panel	yes	yes	yes	yes
5	Compressive strength of core material	yes	yes	yes	yes
6	Shear strength and modulus of core material	yes	yes	yes	yes
7	Long term shear strength	no	no	yes	yes
8	Creep coefficient	no	no	yes	yes
9	Tensile strength and thickness of face material (or declaration)	yes	yes	yes	yes
10	Bending resistance in span and at internal support:				
	- positive bending	yes	yes	yes	yes
	- negative bending	yes	*	*	yes
	Wrinkling stresses:				
	- wrinkling stress, external face:				
	- in span	yes	yes	yes	yes
	- in span, elevated temperature	yes	*	*	yes
	- at internal support	yes	yes	yes	yes
	- at internal support, elevated temp.	yes	*	*	yes
	- wrinkling stress, internal face:				
	- in span	yes	yes	yes	yes
	- at internal support	yes	yes	yes	yes
11	Dimensional tolerances	yes	yes	yes	yes
12	Resistance to point and access loads	n.a.	n.a.	yes	yes
13	Reaction to fire - certification	yes	yes	yes	yes
14	Durability	yes	*	n.a.	yes
15	Long term effects	n.a.	n.a.	yes	yes
16	External fire performance – certification	n.a.	n.a.	n.a.	yes
17	Thermal insulation performance	yes	*	*	yes

*: optional n.a.: not applicable

Optional: if declared, then under control

18	Bending resistance in span and at internal support:				
	- positive bending, elevated temperature		yes	yes	
	- negative bending, elevated temperature		yes	yes	
	Wrinkling stresses:				
	- wrinkling stress, internal face:				
	- in span, elevated temperature		yes	yes	
	- at internal support, elevated temp.		yes	yes	
19	Resistance to fire – certification	yes			
20	Thermal insulation performance		yes		
21	Water permeability	yes			
22	Air permeability	yes			
23	Airborne sound insulation	yes			
24	Sound absorption	yes			
25	Durability		yes		
26	Long term effects		yes		

Table 2.2: Necessary mechanical and physical characteristics

2.3.2 Dimensional tolerances for panels, test specimens, type of the test and conditions

Geometrical characteristics	Figure	Test method	Compliance criteria and specific conditions	
		EN 14509: Annex D	Values of EN 14509	Values according to the EPAQ scheme
Thickness of the panel	2.2	D.2.1	D ≤ 100 mm ± 2 mm D > 100 mm ± 2 %	
Deviation from flatness (according to the length of measurement L)	2.3	D.2.2	L [mm] 200 400 ≥700 Max. deviation from flatness [mm]: 0,6 1,0 1,5	L [mm] ≤200 400 ≥700 Max. deviation from flatness [mm]: 0,4 0,7 1,0 Intermediate values may be interpolated
Depth of metal profile	2.4	D.2.3	5 mm < h ≤ 50 mm ± 1 mm 50 mm < h ≤ 100 mm ± 2,5 mm	
Depth of stiffeners on lightly profiled faces	2.5	D.2.4	d_s ≤ 1 mm ± 30 % von d_s 1 mm < d_s ≤ 3 mm ± 0,3 mm 3 mm < d_s ≤ 5 mm ± 10 % of d_s	Compliance has to be proofed only by a measuring rule and a precision gauge.
Length of the panel	2.6 and 2.7	D.2.5	L ≤ 3000 mm ± 5 mm L > 3000 mm ± 10 mm	L < 6 m: 5 mm L > 12 m: ± 10 mm Intermediate values may be interpolated
Cover width of the panel	2.8 ÷ 2.11	D.2.6	w ± 2 mm	
Deviation from squareness	2.12	D.2.7	s ≤ 0,006 x w	0,006 x w (roof) 0,004 x w (wall)
Deviation from straightness (on length)	2.13	D.2.8	1,0 mm / m not exceeding 5 mm	
Bowing (curvature on length or width)	2.14	D.2.9	2,0 mm / (m length) ≤ 10 mm 8,5 mm / (m width for flat profiles, h ≤ 10 mm) 10,0 mm / (m width for other depth, h > 10 mm)	
Pitch of the profile (p)	2.15, 2.16	D.2.10	h ≤ 50 mm ± 2 mm h > 50 mm ± 3 mm	± 1,5 mm

Table 2.3: Dimensional tolerances for panels, test specimens, type of the test and conditions

Geometrical characteristics	Figure	Test method	Values of EN 14509	Values according to the EPAQ scheme
Pitch of stiffeners (p)	2.5			± 1,5 mm
Width of the ribs (b_1) and Width of the valleys (b_2)	2.5, 2.17	D.2.11	Ribs: ± 1 mm Valleys: ± 2 mm	
Alignment	2.18	EPAQ scheme	-	$\Delta e \leq 3$ mm Δe: difference (overlapping) between inner and outer sheet at the joint ($|e_o - e_U|$) (The reference point of e_u and e_o has to be adapted to the individual geometry under responsibility of the third party)
Difference in measured thickness of joint			-	$\Delta D \leq 2$ mm ΔD: difference of the panel thicknesses D_{right} and D_{left} at the both edges
Longitudinal edge width	2.19		-	$h_u \geq 10$ mm
Edge waviness			-	W = ± 2 mm over 500 mm length

Table 2.3 (continued): Dimensional tolerances for panels, test specimens, type of the test and conditions

2.3.3 Dimensions of panels (examples for measurement)

2.3.3.1 Thickness of the panel (D)

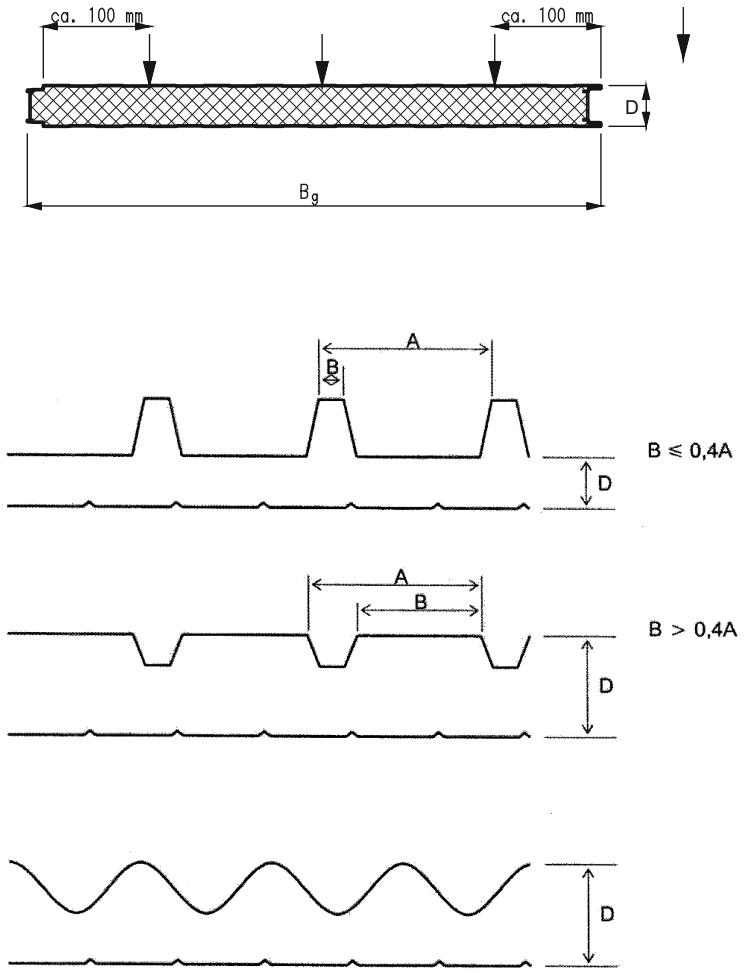


Figure 2.2. Measuring points for thickness measurement

The thickness of the panel has to be measured 200 mm away from the cut edge.

2.3.3.2 Deviation from flatness (according to the length of measurement L)

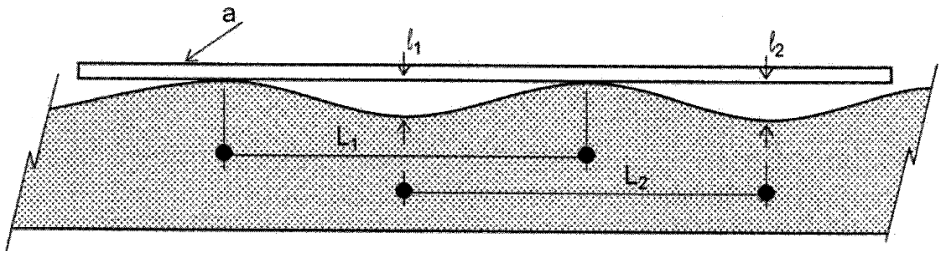


Figure 2.3. Deviation from flatness

2.3.3.3 Depth of metal profile (h)

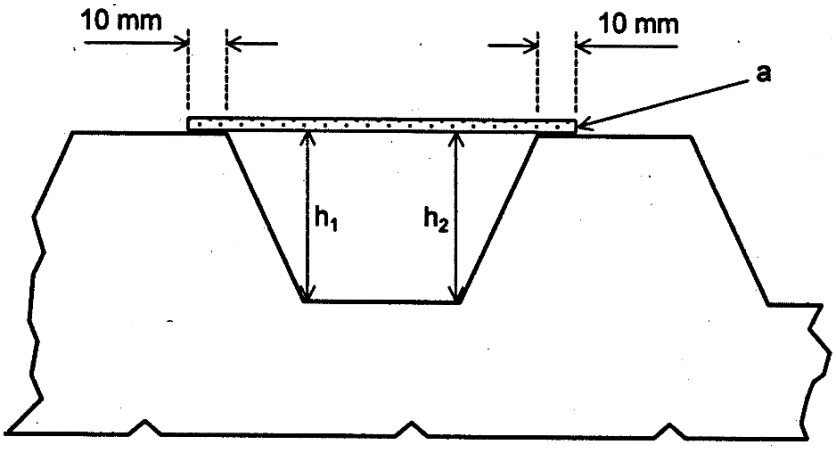


Figure 2.4. Dimensional check of the depth of profile h

2.3.3.4 Depth, width and pitch of stiffeners on lightly profiled faces (d_s, b_2, p)

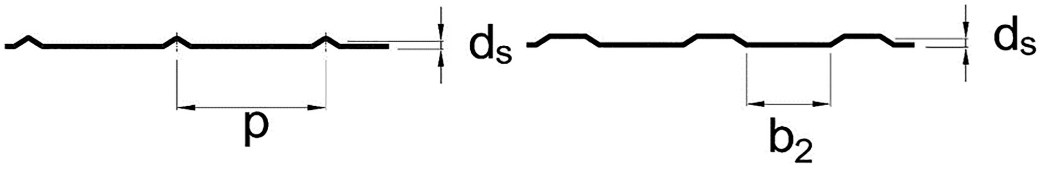
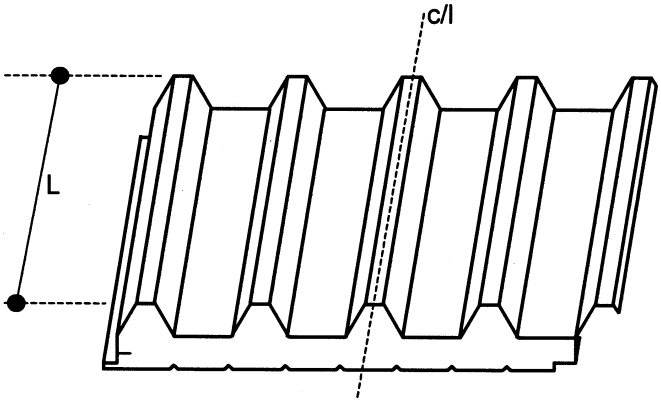


Figure 2.5. Depth, width and pitch of stiffeners and light profiling

2.3.3.5 Length of the panel (L)



c/l – centre line of the panel

Figure 2.6. Length (measurement on a roof panel, on the central rib)

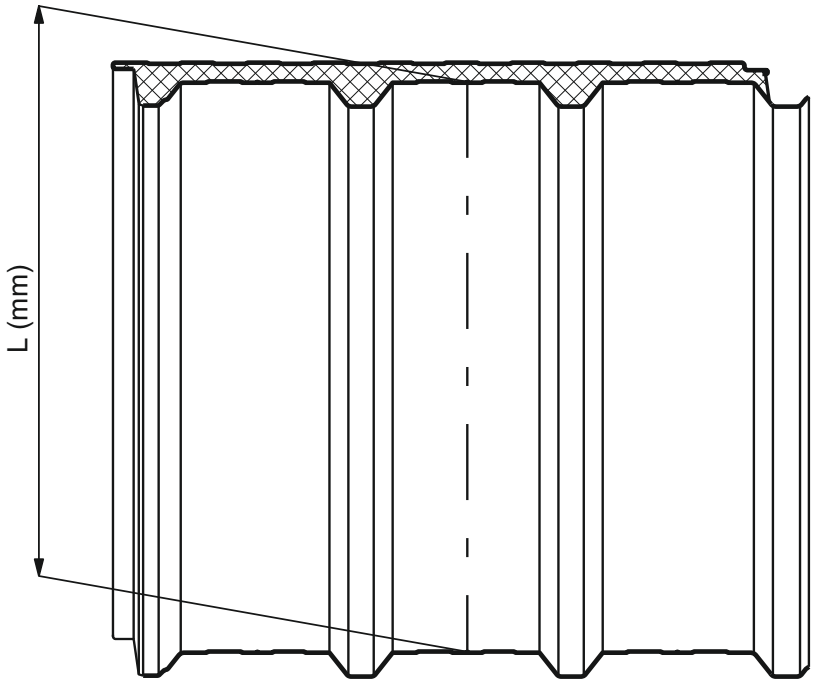


Figure 2.7. Length (measurement on a roof panel, on the central valley)

2.3.3.6 Cover width of the panel (w)

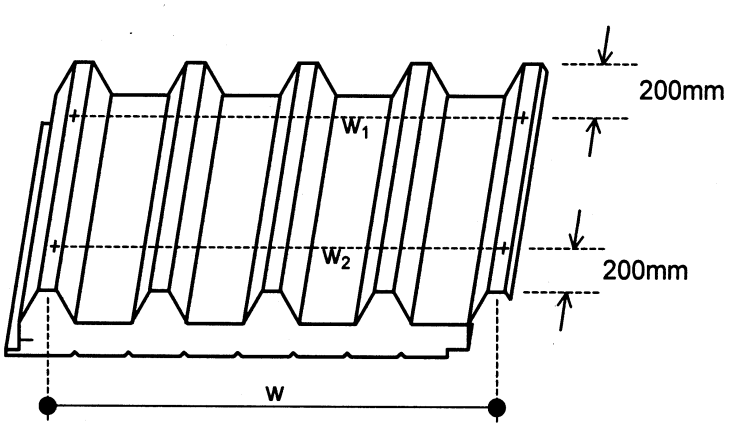


Figure 2.8. Cover width (w) of profiled panels

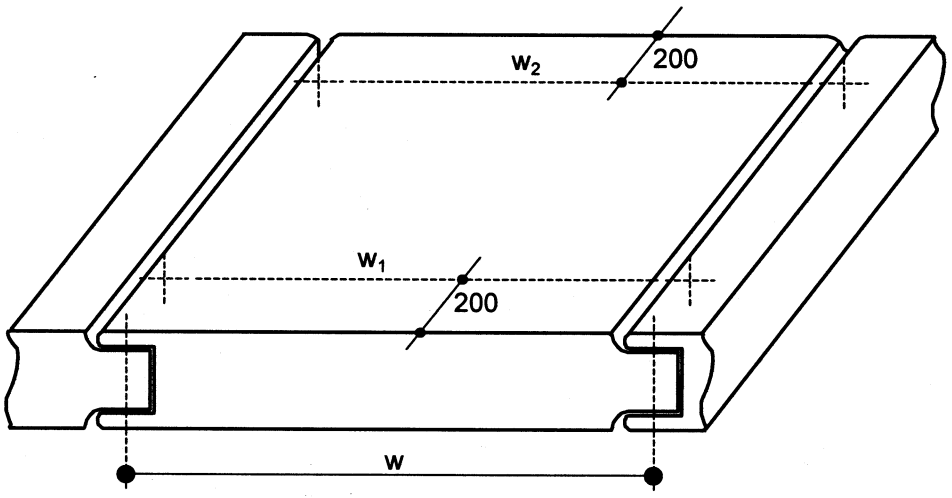


Figure 2.9. Cover width (w) in case of male-female joint

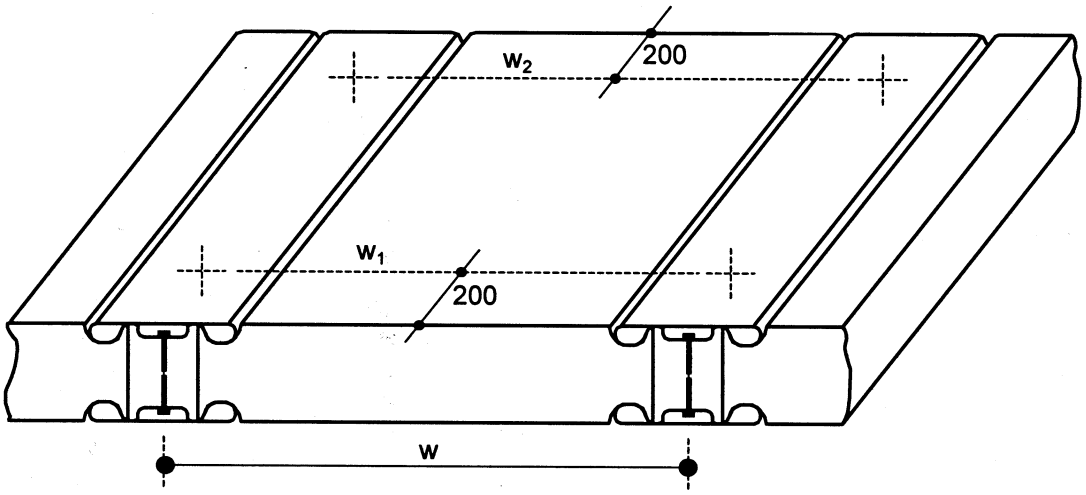


Figure 2.10. Measurement of cover width (w)

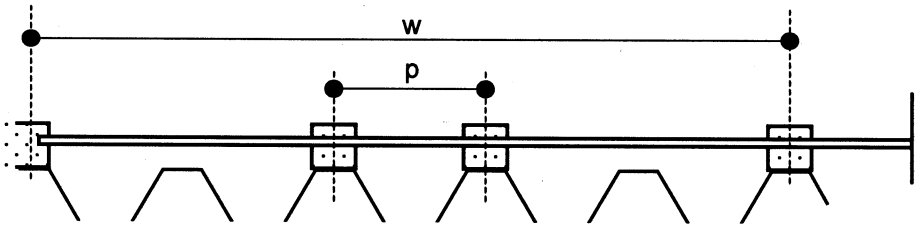


Figure 2.11. Dimensional check for cover width w and pitch p using a calibrated gauge

2.3.3.7 Deviation from squareness (s)

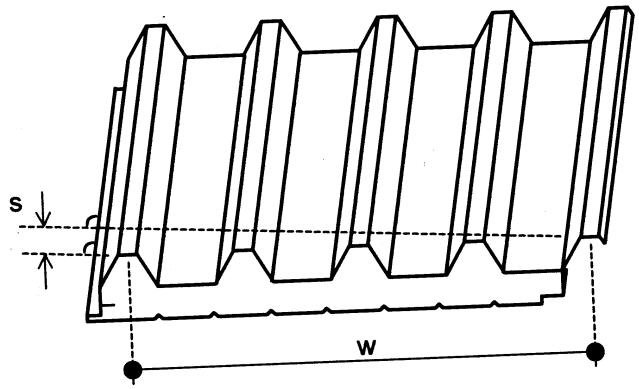


Figure 2.12. Deviation from squareness

2.3.3.8 Deviation from straightness - on length

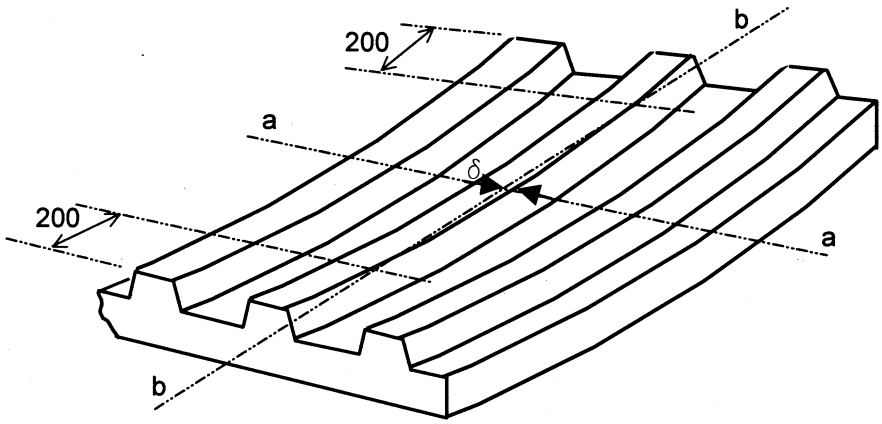


Figure 2.13. Deviation from straightness

2.3.3.9 Bowing or curvature on length or width (b)

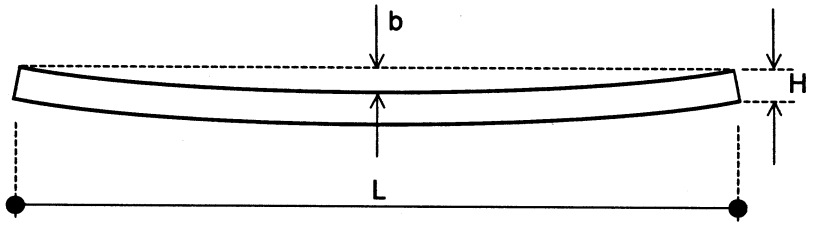


Figure 2.14. Panel bowing

2.3.3.10 Pitch of the profile (p)

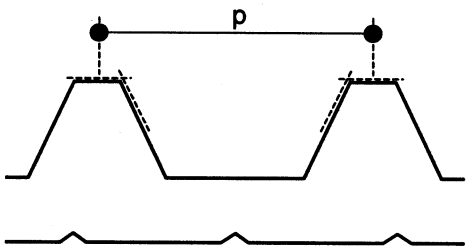


Figure 2.15. Pitch (p)

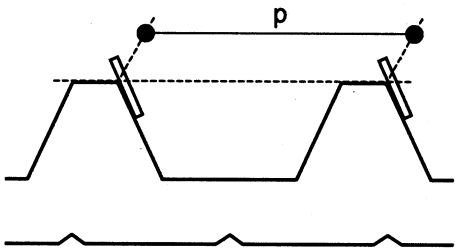


Figure 2.16. Dimensional check of the pitch

2.3.3.11 Width of the ribs (b_1) and width of the valleys (b_2)

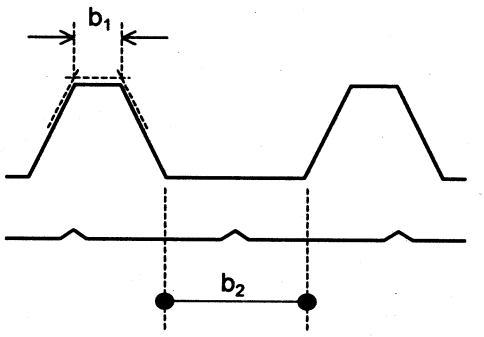


Figure 2.17. Widths of rib and valley

2.3.3.12 Alignment and difference in measured thickness of joint

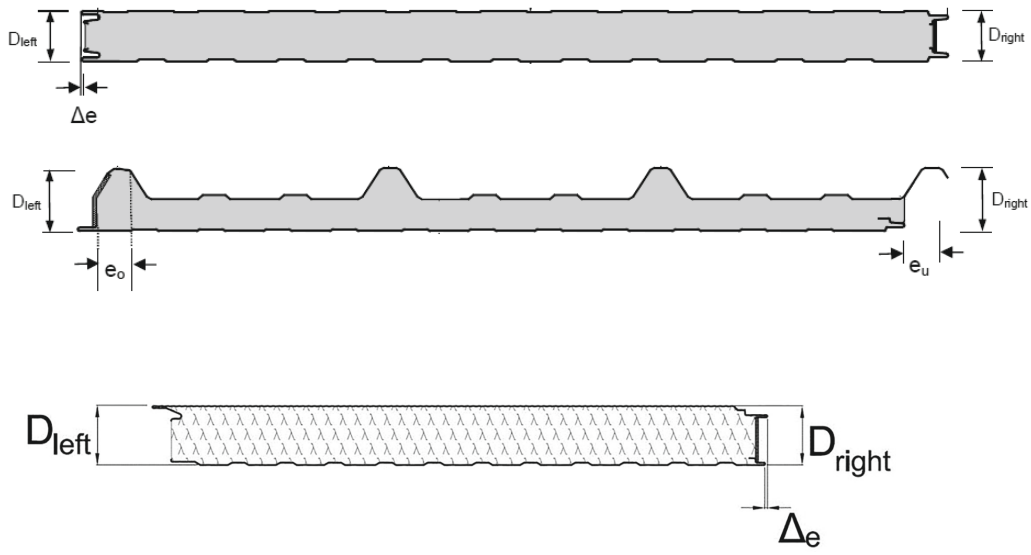


Figure 2.18. Alignment and difference in measured thickness of joint

These dimensions have to be measured 200 mm away from the cut edge.

2.3.3.13 Longitudinal edge length and edge waviness

Detail A:

Figure 2.19. Edge waviness

2.3.4 FPC and external control procedures for panels

Type of test	Test method (EN 14509 / EPAQ scheme)	FPC		External control twice a year
		Mini-mum number of speci-mens	Minimum frequency	Number of specimens
Density of core material	A.8	3	1 per shift/ 6 or 8h[a]	6
Cross-panel tensile strength and modulus (with faces)	A.1	3	1 per shift/ 6 or 8h[a]	10
Compressive strength and modulus of core material	A.2	3	1 per week[a]	10
Shear strength and modulus of core material[e]	A.3	3	1 per week[a]	10
Tensile strength of face material (or declaration – 2.2.2.)	-	3	All deliveries	3
Thickness of face material (or declaration – 2.2.2.)	-	3	All deliveries	3
Shear strength and modulus of the core material based on the testing of a complete panelb	A.4	1	1 per 2 weeks[a]	1
Wrinkling stress (optional see Note 3)	A.5	1	1 per week[a]	1
Dimensional control:		1	1 per shift/ 6 or 8h	1
Panel thickness	D.2.1			
Deviation from flatness	D.2.2			
Depth of profile	D.2.3			
Depth, width and pitch of stiffeners	D.2.4			
Length of panel	D.2.5			
Cover width	D.2.6			
Deviation from squareness	D.2.7			
Deviation from straightness	D.2.8			
Bowing (curvature)	D.2.9			
Pitch of profile	D.2.10			
Width of valleys/ribs	D.2.11			
Alignement	EPAQ			
Difference in measured thickness of joint	EPAQ			
Longitudinal edge length	EPAQ			
Edge waviness	EPAQ			

Type of test	Test method (EN 14509 / EPAQ scheme)	FPC		External control twice a year
		Mini-mum number of speci-mens	Minimum frequency	Number of specimens
Reaction to fire – factory foamed panels (EN 14509, 6.3.5.3)[c]	C.1.2.2 a)	1 set	1/week	Check of the records
	And			
	-	-	Specificati-on record	
Reaction to fire – MW cored panels (EN 14509, 6.3.5.3)[c]	C.4	1 sample top face and 1 sample bottom face	1/shift	Check of the records
	-	-	Certifica-tion of the MW core material	
Reaction to fire – bonded panels with organic cores (EN 14509, 6.3.5.3)[c]	C.1.2.2 a)	1 set	1/week	Check of the records
	Or			
	-	-	Certification of the core material	
Resistance to fire - certification (EN 14509, 6.3.5.3)[c]	-	-	Specificati-on record	
External fire performance - certification (EN 14509, 6.3.5.3)[c] or CWFT				
Thermal insulation performance – EN 14509, 5.2.2	A.10.2.1.1[d]	1	1 per month	1
Normality test or accelerated aging test (depending on the procedure used for the type testing of lambda) of PUR core materials - EN 13165	See 2.2.6	1 per each product group	1 per 2 years	-
Durability – EN 14509, 5.2.3.1	-	-	Specificati-on record	-
Water permeability – 5.2.6 Air permeability – 5.2.7 Water vapour permeability – 5.2.8	Visual in-spection[a]	-	-	-

Table 2.4: FPC and external control procedures for panels

a Where production volumes are below 2 000 m² per shift, the manufacturer shall only test every 2 000 m² or at least every three months. Dimensional control tests and permeability inspections however shall be carried out every shift.

b Alternative test method instead of A.3 on condition that the type testing has to be made in the same way.

c Manufacturer's specification record (see 6.3.5.3) or supplier's statement of fire performance of components.

d Procedure tests λi (single test result of thermal conductivity) in accordance with the appropriate product standard for the core material (A.10.2.1.1) and the clause 2.2.6 of these Quality Regulations.

NOTE 1 The control of the thickness of pre-formed core material or lamellas and the positioning of the joints between individual slabs are of fundamental importance and should be frequently checked (e.g. every 2 h).

NOTE 2 Typical allowable difference in cutting thickness between adjacent pre-manufactured pieces for fabrication with stiff platens is ± 0,5 mm.

NOTE 3 If the wrinkling stress is controlled at least once per week, it is not necessary to control the tension and compression moduli.

Table 2.4 (continued): FPC and external control procedures for panels

3 QUALITY REGULATIONS FOR PROFILES

3.1 Requirements for material properties

3.1.1 Nominal thickness

The nominal thickness of the self-supporting metal sheet (excluding any organic, inorganic or multi-layer coating), as defined in the relevant material standards listed in EN 506, EN 508-1, EN 508-2 and EN 508-3, shall be for all applications equal to or greater than:

- Aluminium: 0,7 mm
- Stainless steel: 0,7 mm
- Steel: 0,6 mm.

The nominal thickness of floor deck profiles (excluding any organic, inorganic or multi-layer coating), as defined in the relevant material standard and listed in EN 1090-4, shall be equal to or greater than 0,75 mm.

3.1.2 Metallic coating of the steel sheet (only in case of floor deck profiles)

Due to the presence of concrete in the intended use, the minimum Zinc metallic coating mass of the steel sheet shall be 275 g/m^2 (Z275). In case of other metallic coatings, the profile manufacturer has to demonstrate the equivalence of the corrosion protection system to the above-mentioned requirement.

3.1.3 Reaction to fire

Metallic coated steel sheet, profiled or flat, fulfils the requirements regarding reaction to fire under the EPAQ scheme when coated on the surface exposed to the fire with a coating of maximum nominal thickness 200 µm and having a coating mass ≤ 300 g/m^2 and a PCS ≤ 7,0 MJ/m^2. The steel sheet surface not exposed to the fire may have an organic coating, provided that this coating has a thickness ≤ 15 µm and a PCS ≤ 0,7 MJ/m^2. Organic coatings exceeding these limits require a classification according EN 13501-1 and shall have a minimum class of reaction to fire behaviour of C-s3, d0.

3.2 Control of material properties

3.2.1 Base material

If the finished product manufacturer buys base materials whose characteristics have already been determined in accordance with the provisions of the hENs listed in the scope of these regulations and are declared by the base material supplier with an inspection certificate 3.1 according to EN 10204 for every batch, the finished product manufacturer‘s system requires only a document check to ensure that the characteristics meet the product manufacturer‘s specifications, provided that the production process for the finished product does not change in an unfavourable way these characteristics. Therefore, the mechanical properties have to be determined on longitudinal direction.

A batch is defined in the respective product standard (e.g. EN 10346) and the batch has to be produced in the same production run.

The inspection certificate 3.1 shall contain the following data:

- Name of the coil coater / producer
- Coil no. or coil batch number
- Indication of the type and grade of material
- Indication of the nominal layer weight of the metallic protective layers in accordance with EN 10346 or of other certified layers
- Format and nominal sheet thickness (t_N) (in mm respectively)
- Coating system

- Weight of the metal protective layer (g/m²) determined in accordance with EN 10346
- Determined thickness of the organic coating visible side/rear side in µm
- Determined values of the mechanical material properties (see also EN 10346 for steel or EN 485-2 for aluminium)
- Yield strength or 0,2 %-proof strength (R_{eH}/$R_{p0,2}$) in MPa
- Tensile strength (R_m) in MPa
- Elongation A_{80mm} / A_{50mm} according to the technical specifications, in %
- Zinc adhesion, required for metallized, organic coated steel for cold forming.

Otherwise, the material cannot be used for production and has to be rejected.

In case of not having an inspection certificate 3.1, all data mentioned above have to be determined by the manufacturer himself.

In case of an incomplete inspection certificate, not containing all data mentioned above, the missing data has to be determined by the manufacturer himself.

3.2.2 Type testing

3.2.2.1 General

All characteristics in EN 14782 or EN 1090-1, where relevant, shall be subjected to type testing with the exception of fire performance when using the CWFT option, where measurement in accordance with EN 14782 is required to ensure that the product meets the definition required for CWFT.

3.2.2.2 Additional requirements of the European Association for Panels and Profiles

Dimensional tolerances are subjected to type testing with additional requirements of the European Association for Panels and Profiles, see Table 3.4 to 3.10.

3.2.2.3 Responsibility

The type testing must be done by third parties for testing according to 1.2.2.2. The evaluation and preparation of the evaluation report must be done by third parties for evaluation and assessment according to 1.2.2.3.

3.2.2.4 Type testing

The type testing shall be made in a recognized laboratory. Alternatively, the type testing can be performed in a not-recognized laboratory; in this case, the presence of an independent representative of a third party is mandatory for calibration and supervision of the tests.

3.2.3 Initial Inspection and External Quality Control

3.2.3.1 General

When an initial inspection is necessary, it shall be conducted prior to the first EQC.

The EQC including audit-testing of samples is carried out at least once a year in the factory of the quality label user, based on the control agreement.

3.2.3.2 Responsibility

The initial inspection must be done by third parties for evaluation and assessment according to 1.2.2.3 and the EQC tests must be done by third parties for testing according to 1.2.2.2.

3.2.3.3 Procedures

The EQC needs to be conducted in accordance with the testing regime described in Table 3.11 and 3.12. The necessary samples are to be taken from the stock. Sampling and testing have to be done by a third party or can be done by the manufacturer in the presence and under the responsibility of a third party.

In each profile production plant, the internal FPC must be confirmed by EQC at least once a year. The responsible third party shall be physically present in the plant once a year.

The record of the results of the FPC must be submitted to the third party by the manufacturer.

The efficiency of an existing quality management system must be shown by certificate or has to be checked by the third party (see clause 1.2.1.2).

In the case of EQC, samples from the stock must be selected in such a way that all profiles are checked in the course of three years period of validity.

The results of the external control are recorded in the test report, in the evaluation report and in the assessment report for EQC of the third party. The manufacturer and the secretariat of the association simultaneously receive one copy of the reports.

Checking of the evaluation of the results within EQC is a task of the Quality Committee for Profiles.

In case of inadequate test results within the framework of the external control, the responsible third party must request the manufacturer to adopt appropriate measures to correct the deviations found. If the deviations are not corrected within the agreed time period, then the third party must inform the Quality Committee for Profiles, which has to decide upon further actions.

The time period within which the manufacturers shall react and report differs based on the severity of the deviations:

– Six months or until the following EQC, in cases of marginal deviations, which do not affect the effecti veness of the FPC, respectively the product quality or which could even show a higher quality, although the EQC measurements are outside of the tolerances given in the CD;

– Two months, in cases of deviations of medium severity, which affect the product quality only on characteristics of less importance so that there is no direct implication on the quality of the product or which affect the effectiveness of the FPC in such a way, that the general function and efficiency still exist;

– Immediately, in cases of severe deviations, which affect considerably the effectiveness of the FPC and/or the product quality on major characteristics. In these cases, the secretariat of PPA-Europe and the Quality Committee for Profiles have to be informed immediately as to discuss the withdrawal of the EPAQ Quality Certificate.

In cases of severe deviations and deviations of medium severity, the responsible third party must check whether the manufacturer has solved the non-conformities or not and the outcome of the measures adopted by the manufacturer shall be included in the EQC reports. The EQC results then shall be either “requirements fulfilled” or “requirements not fulfilled”.

The check by the responsible third party of the measures to correct marginal deviations can be performed during the next EQC. An extra visit in beforehand is not demandable. The outcome of the measures to correct marginal deviations can be included into the EQC reports or can be handled in a separate report. After checking the outcome, the initial EQC results „requirements fulfilled with comments“ can be either kept or

converted into „requirements fulfilled“.

3.2.3.4 Evaluation of test results for mechanical properties
No individual test result in EQC shall be less than the value declared. Otherwise, additional samples need to be taken, tested and the 5 %-fractile value needs to be determined anew. The resulting characteristic value shall not be less than the declared value. Otherwise, the profile loses conformity with the quality label. For the anew determination of the 5%-fractile value, it may be assumed that k = 1,65.

3.2.3.5 Evaluation of test results for other properties
No individual test result in EQC shall be less than the value declared. Otherwise, additional samples need to be tested.

3.2.4 FPC procedures

3.2.4.1 General
The manufacturer shall establish procedures to ensure that the stated values of all of the characteristics are maintained in accordance with EN 14782 or EN 1090-1. EN 14782 or EN 1090-1 show the test methods which must be used for FPC and external control, the number of specimens and the frequency of FPC and external control.

Products according to EN 1090-1 need a certificate of conformity of the FPC prior to the awarding of the Certification Document.

3.2.4.2 FPC for safety in fire characteristics
FPC for safety in fire characteristics shall be carried out according to EN 14782 and EN 1090-1.

3.2.5 Measurement of dimensional characteristics

3.2.5.1 General
The measurements are carried out in accordance with the FPC and the external control procedures. Additional measurement procedures are provided in the Testing Rules for Profiles

3.2.5.2 Materials
For the inspection of the material properties required for the base material, see 3.2.2.

3.2.5.3 Sheet thickness
The measurement of the steel sheet thickness is carried out in accordance with EN 10143 and indeed prior to the cold forming, see also Table 3.11. In the relevant cases, the special requirements of metal coating have to be considered.

If measurements are carried out on profiled sheet, then the measurement of the sheet thickness t is carried out at least on 3 measuring points on one end of profile, see 3.4, Figure 3.2, 3.13, 3.23, 3.29, 3.30 and 3.33. The average value is deemed to be the sheet thickness but no individual value should be beneath the stipulated permissible minus dimension.

3.2.5.4 Trapezoidal profiles

3.2.5.4.1 General information
The inspection of the dimensional accuracy of the trapezoidal profiles is carried out on the basis of spot checks in accordance with the following regulations, during the manufacturing process. All the measurements are carried out 200 mm away from a profile end, if nothing else is indicated.

3.2.5.4.2 Depth of profile h
The distance between the surfaces of the same side of the upper and lower flange is deemed as being the depth of profile h.

The measurement is carried out in accordance with 3.4, Figure 3.4 and 3.5.

3.2.5.4.3 Pitch of the profile p

The pitch of the profile p shall be the distance between the centres of adjacent ribs, measured at 200 mm from profile ends, see 3.4, Figure 3.10. In case the width of flanges is different, all the different pitches have to be measured.

3.2.5.4.4 Cover width w

The cover width w indicates the modular dimension for the width. It is stated by the manufacturer.

The cover widths w_1 and w_2 are measured 200 mm from the profile ends and w_3 is measured in the profile centre of an evenly supported structural member, see 3.4, Figure 3.6. For the correct measurement of the cover width, a second sample shall be used to simulate the overlap of two profiles.

3.2.5.4.5 Cover width difference of the profile w_3

The third measurement w_3 of cover width shall be made across the centre line of the sheet (see 3.2.5.4.4) to determine the cover width difference of the profile. This w_3 measurement shall be within the stated tolerance referred to the average value for w_1 and w_2.

3.2.5.4.6 Width of crown and valley

The widths of crown and valley b must be measured on all the profile ribs, see 3.4, Figure 3.1.

3.2.5.4.7 Radius of bends r

The measurement of the radius is carried out on the inside of the bends in accordance with the positions displayed in 3.4, Figure 3.7.

3.2.5.4.8 Position of flange stiffeners b_k and depth of flange stiffeners h_r

The position b_k and the depth h_r must be measured on all crowns, see 3.4, Figure 3.1.

3.2.5.4.9 Position of web stiffeners h_a, h_b and depth of stiffeners v_{sa}, v_{sb}

With respect to the position h_a, h_b, the vertical distance of the start of the web from the external surface of the upper or lower flange applies, see 3.4, Figure 3.1.

The length h_{sa}, h_{sb}, see 3.4, Figure 3.1, is the calculated difference between the vertical distances from the start and end of the web and the external surface of the upper or lower flange that have been measured.

The distance of the neighbouring parallel displaced web surfaces applies as the displacement v_{sa}, v_{sb}, see 3.4, Figure 3.1, measured between the respective sheet external or internal surfaces.

In the case of profiles with sectional differing web inclines, the average value from the two measurements from both sides of the web applies as the displacement.

3.2.5.4.10 Crown curvature h_e

The crown curvature h_e must be measured on all crowns. In case of crowns with stiffener in the middle, he is obtained by reducing the depth of stiffener measured in beforehand, see 3.4, Figure 3.1.

3.2.5.4.11 Length of the profile l

The length of the profile l must be determined on the middle rib on the profile, see 3.4, Figure 3.6.

3.2.5.4.12 Deviation from squareness S

The determination of the deviation from squareness S must be controlled in accordance with 3.4, Figure 3.9.

3.2.5.4.13 Longitudinal edge upstand s

The longitudinal edge upstand s is measured on the longitudinal edge, see 3.4, Figure 3.1.

3.2.5.4.14 Deviation of side lap D

The deviation of side lap D is defined in 3.4, Figure 3.3. It is determined by means of the straightness of the longitudinal edge.

3.2.5.4.15 Longitudinal edge width b_{uf}

In the case of lower profile flange with longitudinal stiffener, the dimension b_{uf} must be agreed upon with the third party, otherwise it will be inspected on the basis of the flange widths b_u in accordance with the existing formula, see 3.4, Figure 3.1 and Table 3.4.

3.2.5.4.16 Deviation from straightness δ

The deviation from straightness δ is measured on the longitudinal edge of a middle rib, see 3.4, Figure 3.8.

3.2.5.4.17 Position and dimension of perforation

The position and dimension of perforation of acoustic trapezoidal profiles must be inspected in accordance with 3.4, Figure 3.11.

3.2.5.4.18 Flatness of unstiffened or stiffened flange or web

If deviations from flatness in longitudinal direction of the element are visible, then the deviation Δ has to be measured, see 3.4, Figure 3.12.

3.2.5.5 Sinusoidal profiles

3.2.5.5.1 General information

The inspection of the dimensional accuracy of the sinusoidal profiles is carried out on the basis of spot checks in accordance with the following regulations, during the manufacturing process. All the measurements are carried out 200 mm away from a profile end, if nothing else is indicated.

3.2.5.5.2 Depth of profile h

The distance between crowns and valleys is deemed as being the depth of profile h.

The measurement is carried out in accordance with 3.4, Figure 3.14, by means of the application of a measuring aid upon the wave high points. The measurement is carried out to the wave trough.

3.2.5.5.3 Pitch of the profile p

The pitch of the profile p shall be the distances between the centres of adjacent waves, measured at 200 mm from profile ends, see 3.4, Figure 3.15.

3.2.5.5.4 Cover width w

The cover width w indicates the distance of the high points of both external waves.

The cover widths w_1 and w_2 are measured 200 mm from the profile ends and w_3 is measured in the profile centre of an evenly supported structural member respectively. The cover width is determined at the upper side of the profile, see 3.4, Figure 3.16.

3.2.5.5.5 Cover width difference of the profile w_3

The third measurement w_3 of cover width shall be made across the centre line of the sheet (see 3.2.5.5.4) to determine the cover width difference of the profile. This w_3 measurement shall be within the stated tolerance referred to the average value for w_1 and w_2.

3.2.5.5.6 Radius of bends r

The measurement of the radius is carried out at the positions shown in 3.4, Figure 3.17 for each indicated wave on the upper and lower side of the profile by means of radius gauges.

3.2.5.5.7 Deviation from squareness S

The determination of the deviation from squareness S must be controlled in accordance with 3.4, Figure 3.19.

3.2.5.5.8 Length of the profile l

The length of the profile l must be determined on the middle rib on the profile, see 3.4, Figure 3.18.

3.2.5.5.9 Deviation of side lap D

The deviation of side lap D is defined in 3.4, Figure 3.20. It is determined by means of the straightness of the longitudinal edge.

3.2.5.6 Liner trays

3.2.5.6.1 General information

The inspection of the dimensional accuracy is carried out on the basis of spot checks in accordance with the following regulations, during the manufacturing process. All the measurements are carried out 200 mm away from a profile end, if nothing else is indicated.

3.2.5.6.2 Depth of profile h

The distance between the surfaces of the same side of the upper and lower flange is deemed as being the depth of profile h.

The measurement is carried out in accordance with 3.4, Figure 3.22 and 3.23.

3.2.5.6.3 Position of flange stiffeners b_k and depth of flange stiffeners h_r

The position b_k and the height h_r must be measured in accordance with 3.4, Figure 3.22.

3.2.5.6.4 Position of web stiffeners h_a, h_b and depth of web stiffeners v_{sa}, v_{sb}

The vertical distance between the stiffeners and the external surface of the broad flange h_a, h_b and the depth of the stiffeners v_{sa}, v_{sb} must be measured according to 3.4, Figure 3.22.

3.2.5.6.5 Width of flanges b_s

The measurements are carried out on both flanges, see 3.4, Figure 3.22.

3.2.5.6.6 Cover width w

The cover widths w_1 and w_2 are measured 200 mm from the profile ends and w_3 is measured in the profile centre of an evenly supported element, see 3.4, Figure 3.23 and 3.24.

3.2.5.6.7 Radius of bends r

The radius r is measured 200 mm from the profile ends and in the profile centre in accordance with the positions displayed in 3.4, Figure 3.22.

3.2.5.6.8 Length of the profile l

The length of the profile l must be measured in the centre of the profile, see 3.4, Figure 3.24.

3.2.5.6.9 Deviation of side lap D

The deviation of side lap D is defined in 3.4, Figure 3.25. It is determined by means of the straightness of the longitudinal edge.

3.2.5.6.10 Longitudinal edge upstand s

The longitudinal edge upstand s is measured on the longitudinal edge, see 3.4, Figure 3.22.

3.2.5.6.11 Corner angle flange/web φ

The corner angle φ is measured according to 3.4, Figure 3.26.

3.2.5.6.12 Deflection of flange f_s

The deflection of the narrow upper flange f_s may not exceed a maximum level of $l/300 \leq 20$ mm, see 3.4, Figure 3.24.

3.2.5.6.13 Curvature on width f_q

The curvature on width $\pm f_q$ has to be determined at the centre of a profile, which is supported at a distance interval L and attached at the points of support of the pressed down profile in the vertical fixed position with fixation of the webs in 90° (e.g. with a continuous cold formed angle), see 3.4, Figure 3.27.

3.2.5.6.14 Longitudinal corrugation f_w

The longitudinal corrugation f_w is determined by means of the installation of an appropriate measuring device at the two highest peaks. The completed measurement to the deepest wave trough from the measuring line is the measurement value for the lengthwise waviness f_w, see 3.4, Figure 3.27.

3.2.5.6.15 Position and dimension of perforation

The position and dimension of perforation of acoustic profiles must be inspected in accordance with 3.4, Figure 3.28.

3.2.5.7 Sidings / Façade profiles

3.2.5.7.1 General information

The inspection of the dimensional accuracy is carried out on the basis of spot checks in accordance with the following regulations, during the manufacturing process. All the measurements are carried out on a laid down position, 200 mm away from a profile end, if nothing else is indicated.

3.2.5.7.2 Length of the profile l

The length of the profile l must be measured in the centre of the profile.

3.2.5.7.3 Depth of profile h

The measurement is carried out in accordance with 3.4, Figure 3.29 or Figure 3.30.

3.2.5.7.4 Cover width w

The cover width w indicates the modular dimension for the width; it is stated by the manufacturer. The cover widths w_1 and w_2 are measured 200 mm from the profile ends and w_3 is measured in the profile centre of an evenly supported element. For the correct measurement of the cover width, a second sample shall be used to simulate the joint of two profiles, see 3.4, Figure 3.29 or Figure 3.30.

3.2.5.7.5 Cover width difference of the profile w_3

The third measurement w_3 of cover width shall be made across the centre line of the sheet (see 3.2.5.7.4) to determine the cover width difference of the profile. This w_3 measurement shall be within the tolerance given in Table 3.7 referred to the average value for w_1 and w_2.

3.2.5.7.6 Geometry of the hanging and/or jointing system

This concerns all the dimensions of the hanging and/or jointing system. No general tolerances can be fixed; the tolerances have to be defined during the type testing stage.

3.2.5.7.7 Width of small flanges b_f and b_s
The responsible third party has to define during the type testing whether the width of a small flange is functional (b_f) or only constructional (b_s). The given tolerances depend on the type of dimension. The measurements are carried out on both flanges, see 3.4, Figure 3.29 or Figure 3.30.

3.2.5.7.8 Width of broad flange b_o
The measurements are carried out in accordance with 3.4, Figure 3.29 or Figure 3.30.

3.2.5.7.9 Longitudinal edge upstand s
The longitudinal edge upstand s is measured on the longitudinal edge, see 3.4, Figure 3.29.

3.2.5.7.10 Corner angle flange/web φ
The corner angle φ is measured according to 3.4, Figure 3.29.

3.2.5.7.11 Curvature on width f_q
The curvature on width ± f_q has to be determined at the centre of a profile, which is supported at a distance interval L and attached at the points of support of the pressed down profile in the vertical fixed position, see 3.4, Figure 3.27.

3.2.5.7.12 Deviation from squareness S
The determination of the deviation from squareness S must be controlled in accordance with 3.4, Figure 3.32.

3.2.5.7.13 Deviation from straightness δ
The deviation from straightness δ is measured on the longitudinal edge, see 3.4, Figure 3.31.

Deviation from straightness has to be measured on straight profiles.

3.2.5.7.14 Longitudinal corrugation f_w
The longitudinal corrugation f_w is determined by means of the installation of an appropriate measuring device at the two highest peaks. The completed measurement to the deepest wave trough from the measuring line is the measurement value for the lengthwise waviness f_w, see 3.4, Figure 3.27.

3.2.5.7.15 Position of flange stiffeners b_k and depth of flange stiffeners h_r (where is the case)
The position b_k and the depth h_r must be measured in accordance with 3.4, Figure 3.22.

3.2.5.7.16 Position of web stiffeners h_a, h_b and depth of web stiffeners v_{sa}, v_{sb} (where is the case)
The vertical distance between the stiffeners and the external surface of the broad flange h_a, h_b and the depth of the stiffeners v_{sa}, v_{sb} must be measured according to 3.4, Figure 3.22.

3.2.5.7.17 Deviation of side lap D (if visible after installation)
The deviation of side lap D is defined in 3.4, Figure 3.20. It is determined by means of the straightness of the longitudinal edge.

3.2.5.7.18 Radius of bends r
The measurement of the radius r is carried out 200 mm from the profile ends and in the profile centre, on the inside of the bends, see 3.4, Figure 3.29.

3.2.5.7.19 Position and dimension of perforation
In case of perforated profiles, the position and dimension of perforation must be inspected in accordance with 3.4, Figure 3.28.

3.2.5.8 Standing seam profiles

3.2.5.8.1 General information

The inspection of the dimensional accuracy is carried out on the basis of spot checks in accordance with the following regulations, during the manufacturing process. All the measurements are carried out 200 mm away from a profile end, if nothing else is indicated.

For practicable reasons, all the dimensions of the profiles may be measured in a laid down state. Model 2 (see 3.4, Figure 3.34) and 3 (see 3.4, Figure 3.35) have to be placed on the corresponding holders. Nevertheless, decisive is the geometry of the profiles in the completely mounted state, including seaming the eyes for profiles model 2 (see 3.4, Figure 3.34).

NOTE “Completely mounted state” does not mean that these regulations automatically apply to finally executed roofs or façades.

3.2.5.8.2 Depth of profile h

The distance between the surfaces of the same side of the lower and upper flange or the distance between the surface of the lower broad flange and the highest point on the external surface of the seam’s eye (seam’s flange) is deemed as being the depth of profile h.

The measurement is carried out in accordance with 3.4, Figures 3.33 to 3.36.

3.2.5.8.3 Position of flange stiffeners b_k and depth of flange stiffeners h_r

The position b_k and the height h_r must be measured in accordance with 3.4, Figures 3.33 to 3.36.

3.2.5.8.4 Position of web stiffeners h_a, h_b and depth of web stiffeners v_{sa}, v_{sb}

The vertical distance between the stiffeners and the external surface of the broad flange h_a, h_b and the depth of the stiffeners v_{sa}, v_{sb} must be measured according to 3.4, Figure 3.22.

The two subchapters from above are not valid for stiffeners or geometries of parts that belong to the overlapping system of the profiles. The tolerances of these parts have to be defined during the type testing stage.

3.2.5.8.5 Geometry of the seam-locking system

This concerns all the dimensions of the seam-locking system. No general tolerances can be fixed; the tolerances have to be defined during the type testing stage.

3.2.5.8.6 Width of crowns and valleys / broad flange b_o, b_u

The width of crowns and valleys of all profile ribs or broad flange b_o, b_u must be measured, see 3.4, Figures 3.33 to 3.36.

3.2.5.8.7 Cover width w

The cover width w indicates the modular dimension for the width; it is stated by the manufacturer. The cover width has to be measured as displayed in 3.4, Figures 3.33 to 3.36. For a correct measurement, a second sample shall be used to simulate the overlap of two profiles, see 3.4, Figure 3.36.

3.2.5.8.8 Length of the profile l

The length of the profile l must be measured in the centre of the profile. If the temperature of the profiles differs between the production and the moment of measurement, the thermal expansion coefficient of the material and the measurement tool have to be taken into account.

3.2.5.8.9 Radius of bends r

The measurement of the radius r is carried out 200 mm from the profile ends and in the profile centre, on the inside of the bends, in accordance with the positions displayed in 3.4, Figures 3.33 and 3.35.

3.2.5.8.10 Deviation from straightness δ

The deviation from straightness δ is measured on the longitudinal edge, see 3.4, Figure 3.8.

Deviation from straightness has to be measured on straight or tapered profiles with straight edges. This characteristic is not applicable for free formed profiles.

3.2.5.8.11 Deviation from squareness S (for wall applications)

The determination of the deviation from squareness S must be controlled in accordance with 3.4, Figure 3.9.

3.2.5.8.12 Deviation of side lap D

The deviation of side lap D is defined in 3.4, Figure 3.25. It is determined by means of the straightness of the longitudinal edge.

3.2.5.8.13 Deflection of flange f_s

The deflection of the narrow upper flange f_s may not exceed a maximum level of $l / 300 \leq 20$ mm, see 3.4, Figure 3.24.

3.2.5.8.14 Longitudinal edge upstand s

The longitudinal edge upstand s is measured on the longitudinal edge, see 3.4, Figure 3.22.

3.2.5.8.15 Longitudinal edge width b_{uf}

The longitudinal edge width b_{uf} is measured as displayed in 3.4, Figure 3.1.

3.2.5.8.16 Corner angle flange/web φ

The corner angle φ is measured according to 3.4, Figure 3.26.

3.2.5.8.17 Position and dimension of perforation

In case of perforated profiles, the position and dimension of perforation must be inspected in accordance with 3.4, Figure 3.28.

3.2.5.9 Floor deck profiles

3.2.5.9.1 General information

The inspection of the dimensional accuracy of the floor deck profiles is carried out on the basis of spot checks in accordance with the following regulations, during the manufacturing process. All the measurements are carried out 200 mm away from a profile end, if nothing else is indicated.

3.2.5.9.2 Depth of profile h

The distance between the surfaces of the same side of the upper and lower flange, excluding longitudinal stiffeners, transversal stiffeners, dovetail stiffeners and embossments is deemed as being the depth of profile h.

The measurement is carried out in accordance with 3.4, Figure 3.4 and 3.5.

3.2.5.9.3 Depth of longitudinal stiffeners in flange h_r and position of longitudinal stiffeners in flange b_k

The depth h_r and the position b_k must be measured on all flanges, see 3.4, Figure 3.1.

The measurement of the depth of dovetail stiffener h_r is carried out in accordance with 3.4, Figure 3.37.

3.2.5.9.4 Depth of web stiffeners v_{sa}, v_{sb} and position of web stiffeners h_a, h_b

With respect to the position h_a, h_b, the vertical distance of the start of the web from the external surface of the upper or lower flange applies, see 3.4, Figure 3.1.

The length h_{sa}, h_{sb}, see 3.4, Figure 3.1, is the calculated difference between the vertical distances from the start and end of the web and the external surface of the upper or lower flange that have been measured.

3.2.5.9.5 Upper width w_o and lower width w_u of dovetail stiffeners

The upper width w_o and lower width w_u of dovetail stiffeners are shown in Figure 3.37. These dimensions are the outside dimensions of the stiffener. From a practical point of view, the lower width w_{ui} can be measured on the inner side; in this case, two times the nominal sheet thickness t has to be added to the measured value to achieve w_u.

3.2.5.9.6 Difference between the upper width and lower width of dovetail stiffeners $w_o - w_u$

The difference between the upper width and lower width of dovetail stiffeners $w_o - w_u$ defines the slope of the webs, which is especially important for the end anchorage of the steel to the concrete.

3.2.5.9.7 Depth of embossments d_{emb}

The role of an embossment is to enhance the bonding effect with the concrete. The depth of embossments has to meet the tolerances indicated in table 3.10, unless different tolerances are given due to technical reasons during type testing.

The measurement is carried out in accordance with 3.4, Figure 3.38.

3.2.5.9.8 Position and shape (pitch, obliquity, length, width / diameter) of embossments

The position and shape (pitch, obliquity, length, width / diameter) of embossments are not so critical for the loadbearing capacity of the floor deck as e.g. the depth of embossments and therefore relatively large tolerances are allowed (as indicated in table 3.10), unless stricter tolerances are given due to technical reasons during type testing.

The measurement is carried out in accordance with 3.4, Figure 3.38.

3.2.5.9.9 Depth of transversal stiffeners in flange h_r

The role of a transversal stiffener is to stiffen the plane part of profiles' flange. The depth of the transversal stiffeners in flange needs to be measured in accordance with Figure 3.39 and has to meet the tolerances indicated in Table 3.10.

3.2.5.9.10 Length, width, pitch and position of transversal stiffeners in flange

These dimensions need to be measured in accordance with Figure 3.39 on at least one stiffener at each flange and have to meet the tolerances indicated in Table 3.10.

3.2.5.9.11 Pitch of the profile p

The pitch of the profile p shall be the distance between the centres of adjacent ribs, measured at 200 mm from profile ends, see 3.4, Figure 3.10. In case the width of flanges is different, all the different pitches have to be measured.

3.2.5.9.12 Width of crown and valley

The width of crown b_o and of valley b_u must be measured on all the profile ribs, see 3.4, Figure 3.1.

The width of crown b_{do}, of the valley b_{du} and of the lower opening b_{dui} of the dovetail profile shall be measured according to 3.4, Figure 3.40.

3.2.5.9.13 Cover width w

The cover width w indicates the modular dimension for the width. It is stated by the manufacturer.

The cover widths w_1 and w_2 are measured 200 mm from the profile ends and w_3 is measured in the middle of the profile of an evenly supported structural member, see 3.4, Figure 3.6. For the correct measurement of the cover width, a second sample shall be used to simulate the overlap of two profiles.

3.2.5.9.14 Cover width difference w_3

The third measurement w_3 of the cover width shall be made across the middle line of the profile (see 3.2.5.9.13) to determine the cover width difference of the profile. This w_3 measurement shall be within the stated tolerance referred to the average value for w_1 and w_2.

3.2.5.9.15 Radius of bends r

The measurement of the radius is carried out on the inside of the bends in accordance with the positions displayed in 3.4, Figure 3.7.

3.2.5.9.16 Crack formation after bending

Profiles with organic coating intended to be used in environments of corrosivity category C3 to C5 shall only be subjected to inspection of crack formation as specified in EN 13523-7:2014, 5.2 on two shoulders of bends with the greatest amount of deformation. The requirements are given in Table 3.10. The test results provided by the coil supplier in a 3.1 inspection certificate can be used by the profile producer.

In case of profiles with organic coating intended to be used in environments of corrosivity category C3 to C5, the crack formation shall be checked on the profile with an eight times magnifying glass.

3.2.5.9.17 Deviation from straightness δ

The deviation from straightness δ is measured on the longitudinal edge of a middle rib, see 3.4, Figure 3.8.

3.2.5.9.18 Length of the profile l

The length of the profile l must be determined on a middle rib on the profile, see 3.4, Figure 3.6 and has to meet the tolerances indicated in Table 3.10.

In case of closed shape profiles, the tolerances for the length have to be different, because this type of profiles cannot be overlapped.

3.2.5.9.19 Longitudinal edge upstand s (where applicable)

The longitudinal edge upstand s is measured on the longitudinal edge, see 3.4, Figure 3.1.

3.2.5.9.20 Deviation of side lap

In case of floor deck profiles, the deviation of side lap is only a parameter of aesthetics and therefore this characteristic is not important to be measured.

3.2.5.9.21 Longitudinal edge width (if the profiles will be stitched) b_{uf}

In case of stitched profiles with a longitudinal stiffener in the lower flange, the dimension b_{uf} must be agreed upon with the third party, otherwise it will be inspected on the basis of the flange width b_u in accordance with the existing formula, see 3.4, Figure 3.1 and Table 3.10.

3.2.5.9.22 Crown curvature h_e

In case of floor deck profiles with curved flanges, the crown curvature h_e is the deviation from the designed geometry.

The crown curvature h_e must be measured on all crowns. In case of crowns with stiffener in the middle, h_e is obtained by reducing the depth of stiffener measured in beforehand, see 3.4, Figure 3.1.

3.3 Additional information for profiles

3.3.1 Values controlled / needed for different applications of profiles

Nr.	Characteristic	External wall	Internal walls	Ceilings	Roofs	Composite floor decks
1	Quality of metal	yes	yes	yes	yes	yes
2	Thickness of metal	yes	yes	yes	yes	yes
3	Mechanical resistance/ Yield strength/grade of metal	yes	yes	yes	yes	yes
4	Dimensional change (Declaration)	yes	yes	yes	yes	yes
5	Durability/quality of the coating (Declaration)	yes	yes	yes	yes	yes
6	Mechanical resistance	no	no	no	yes	
	Resistance to concentrated forces[1,2,3,4]	no	no	no	yes	no
	Walkability[5]	no	no	no	no	yes
7	τ value for longitudinal shear resistance according to EN 1994-1-1	no	no	no	no	yes
8	Water permeability Vapour and air permeability (Visual assessment)	yes	yes	yes	yes	yes
9	Dimensional tolerances	yes	yes	yes	yes	yes
10	External fire performance – certification	no	no	no	yes	no
11	Reaction to fire – certification	yes	yes	yes	yes	yes
12	Release of dangerous substances	Where required				

1. A span has to be stated, based on existing walkability tests or on the test of EN 14782. In case of existing documents for both alternatives, the larger span has to be stated (which usually comes from the test of EN 14782).
Alternatively, each manufacturer can state a span of 400 mm without any tests - according to EN 14782.

2. Other tests, like walkability tests, may be sufficient to evaluate the resistance to concentrated forces. This evaluation has to be done by an independent expert of the Quality Committee for Profiles.

3. The report of the test for determination of resistance to concentrated forces has to be checked by the independent expert of the Quality Committee for Profiles. This independent expert writes a certification report that has to be the basis for the award of the Quality Label EPAQ.

4. Or according to special national requirements.

5. Based on walkability tests according to EN 1090-4, B.7.3.

Table 3.1: Values controlled / needed for different applications of profiles

3.3.2. Type testing procedures for base material

Characteristic	Requirement clause of		Evaluation method		Minimum number of specimens		
	EN 14782	EN 1090-1	EN 14782	EN 1090	With traceability system but without base material manufacturer's inspection certificate[c] (only EN 14782)	With traceability system[d] and base material manufacturer's inspection certificate[c]	Compliance criteria and specific conditions
Quality of metal	4.1	4.1.2 → EN 1090-4, 5.3 (for steel) 4.1.3 → EN 1090-5, 5.3 (for aluminium)	Visual inspection[a]	-	1	1	Manufacturer's declaration
Thickness	4.2 and EPAQ	4.1.2 → EN 1090-4, 5.3, 5.4 and 5.5.1 (for steel) and EPAQ 4.1.3 → EN 1090-5, 5.3, 5.4 and 5.5.1 (for aluminium) and EPAQ	4.2	EN 10346 (for steel)	3	1[e]	Within the manufacturer's stated tolerance
Mechanical resistance Yield strength/grade of metal	4.3	4.1.2 → EN 1090-4, 5.3 (for steel) 4.1.3 → EN 1090-5, 5.3 (for aluminium)	EN ISO 6892-1	EN ISO 6892-1	3	1[e]	Manufacturer's declaration

Dimensional change	4.6	-	-	-	-	-	Manufacturer's declaration
Durability/ corrosion protection	4.8	4.9 → EN 1090-4, 5.3, 5.9, 10.1 and Annex E (for steel) and EPAQ 4.9 → EN 1090-5, 10.1 (for aluminium)	4.8	EN 1090-4, Annex E	-	-	Declaration or compliance with appropriate national technical specification
Release of regulated dangerous substances	4.11	4.7	-	Checking that constituent products conform to European standards	-	-[b]	As appropriate when national provisions exist

a This concerns the quality of the base material (no pin-holes, micro-holes, pits, etc.).

b In this case, the finished product manufacturer shall verify that the inspection certificate 3.1 in accordance with EN 10204 indicates that the base material (e.g. coils) has the characteristics that he needs to produce the finished product.

c Inspection certificate 3.1 in accordance with EN 10204

d These tests shall be done by the finished product manufacturer.

e In this case, the finished product manufacturer shall verify that the inspection certificate 3.1 in accordance with EN 10204 indicates that the base material (e.g. coils) has the characteristics that he needs to produce the finished product and shall perform additional test(s).

Table 3.2: Type testing procedures for base material

3.3.3. Type testing procedures for profiles

Characteristic	Requirement clause of		Evaluation method		Minimum number of specimens	Compliance criteria and specific conditions
	EN 14782	EN 1090-1	EN 14782	EN 1090-1		
Resistance to concentrated forces[a]	4.3	-	Annex B	-	B.5 of EN 14782	All test results ≥ manufacturer's stated value: a span compatible with a force of 1,2 kN
Walkability[d]	-	-	-	EN 1090-4, B.7.3	See EN 1090-4, B.7.3	See EN 1090-4, B.7.3
Load bearing capacity[d, e]	-	4.5.2	-	5.6	See EN 1993-1-3	See EN 1993-1-3
τ value for longitudinal shear resistance[d, f]	-	-[f]	-	-[g]	1[h]	Structural testing to relevant European technical specification
Weldability/Material[c]	-	4.3	-	5.4	1	Checking of inspection documents for compliance with the specified requirements to the constituent product
Water permeability	4.4	EN 1090-4, A.4.2 (for steel) EN 1090-5, A.4.2 (for aluminium)	Visual inspections	Visual inspections	Random	Pass
Dimensional tolerances: Initial set up of the manufacturing machines	4.7 and system EPAQ	4.2 → EN 1090-4, 11, D.2 (for steel) and EPAQ 4.2 → EN 1090-5, D.2 (for aluminium) and EPAQ	EN 506, EN 508-1, EN 508-2 or EN 508-3 and EPAQ	5.3 and system EPAQ	3 of minimum and maximum sheet thickness	All test results within the tolerances of EPAQ

External fire performance[a]	4.9[b]	-	ENV 1187	-	See EN 13501-5	Classification in accordance with EN 13501-5
Reaction to fire	4.10[b] and EPAQ	4.6[b] and EPAQ	Annex C and EN 13501-1	5.8	See EN 13501-1	Classification in accordance with EN 13501-1

a Applies only to roofing products

b For products requiring testing

c Fracture toughness has to be mentioned in the type testing, even if it is not applicable to profiles

d Applies only in case of floor decks application.

e The load bearing capacity of the floor deck profiles is needed for the construction stage of concrete pouring,

f This value shall be determined for the hardened compound between profile and concrete in accordance with EN 1994-1-1.

g The ascertainment is based on the values given in the existing national assessments or approvals based on EN 1994-1-1.

h The number of test specimens shall be in accordance with EN 1994.

Table 3.3: Type testing procedures for profiles

3.3.4. Dimensional tolerances for trapezoidal profiles, test specimens, type of the test and conditions

Title	Symbols	Test method acc. to EN 508 Annex D	Profiles without stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme	Profiles with stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme
Sheet thickness	t		Tolerances according to EN 10143, for steel Tolerances according to EN 485-4, for aluminium	
Depth of profile	h	D.1.2	$h \leq 50$ mm ± 1,0 mm 50 mm < $h \leq 100$ mm ± 1,5 mm $h > 100$ mm ± 2,0 mm	
Depth of stiffeners	h_r v_s	D.1.3		+3 mm -1 mm +2 mm -(0,15 x $v_s \leq 1$) mm
Position of stiffeners	h_a, h_b, h_{sa}, h_{sb}, b_k			±3 mm
Pitch of the profile	p	D.1.4	$h \leq 50$ mm ± 2,0 mm 50 mm < $h \leq 100$ mm ± 3,0 mm $h > 100$ mm ± 4,0 mm	no requirement
Widths of crown and valley	b	D.1.5	+2 mm - 1 mm	+4 mm -1 mm
Cover width	w_1, $_2$	D.1.6	$h \leq 50$ mm ± 5,0 mm $h > 50$ mm ± 0,1 x h ≤ 15 mm	
Cover width difference	w_3		$(w_1 + w_2)/2$ - tolerance ≤ $w_3 \leq (w_1 + w_2)/2$ + tolerance	
Radius of bends	r	D.1.7	+2 mm 0 mm	±2 mm
Deviation from straightness	δ	D.1.8	2,0 mm / m of sheet length not exceeding 10 mm	
Deviation from squareness	S	D.1.9	$S \leq 0,005$ x w	no requirement
Length of the profile	l	D.1.10	$L \leq 3000$ mm + 10 mm -5 mm $L > 3000$ mm + 20 mm -5 mm	

Table 3.4: Dimensional tolerances for trapezoidal profiles, test specimens, type of the test and conditions

Title	Symbols	Test metho-dacc. to EN508 Annex D	Profiles without stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme	Profiles with stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme
Deviation of side lap	D	D.1.11	D ≤ ± 2,0 mm on a length of 500 mm	
Longitudinal edge upstand	s		s ≥ 10 mm if s is defined: +5 mm -2 mm	
Longitudinal edge width	b_{uf}		$b_u \leq 30$ mm $b_u/2 + 5 \leq b_{uf} \leq b_u - 5$ $b_u > 30$ mm $20 \leq b_{uf} \leq b_u - 5$	
Crown curvature	h_e		±3 mm	
Flatness of unstiffened or stiffened flange or web	Δ		Visual inspection	
Hole diameter	d_n		≤ Ø 5 mm ± 0,2 mm > Ø 5 mm + 0,2 mm -0,4 mm In case of additional coating after profiling, the measurement must be done without additional coating.	
Hole pitch	u_x		+ 2,0 / -1,0 mm	
Offset	v		± 2,0 mm	
Row spacing	u_y		± 2,0 mm	
Edge spacing	e_g, e_s		The minimum values to be complied will be specified during type testing	
Total number of rows (transversal direction)			± 0 The number must be specified by the manufacturer during type testing ± 3% In case of completely perforated sheets	
Total number of rows per meter (longitudinal direction))			± 3% The number must be specified by the manufacturer during type testing	

Table 3.4 (continued): Dimensional tolerances for trapezoidal profiles, test specimens, type of the test and conditions

3.3.5. Dimensional tolerances for sinusoidal profiles, test specimens, type of the test and conditionsn

Title	Symbols	Test method acc. to EN 508 Annex D	Values (grey) of the EPAQ scheme
Sheet thickness	t		Tolerances according to EN 10143, for steel Tolerances according to EN 485-4, for aluminium
Depth of profile	h		$h \leq 50$ mm ± 1,0 mm 50 mm $< h \leq 100$ mm ± 1,5 mm $h > 100$ mm ± 2,0 mm
Pitch of the profile	p		± 3,0 mm
Cover width	$w_{1,2}$		± 0,01 x w
Cover width difference	w_3		$(w_1 + w_2)/2$ - tolerance $\leq w_3 \leq (w_1 + w_2)/2$ + tolerance
Radius of bends	r		± 10%
Deviation from squareness	S		$S \leq 0{,}005 \times w$
Length of the profile	l		$L \leq 3000$ mm + 10 mm -5 mm $L > 3000$ mm + 20 mm -5 mm
Deviation of side lap	D		$D \leq$ ± 2,0 mm on a length of 500 mm

Table 3.5: Dimensional tolerances for sinusoidal profiles, test specimens, type of the test and conditions

3.3.6. Dimensional tolerances for liner trays, test specimens, type of the test and conditions

Title	Symbols	Test method acc. to EN 508 Annex D	Profiles without stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme	Profiles with stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme
Sheet thickness	t		Tolerances according to EN 10143, for steel Tolerances according to EN 485-4, for aluminium	
Depth of profile	h	D.1.2	h ≤ 50 mm ± 1,0 mm 50 mm < h ≤ 100 mm ± 1,5 mm h > 100 mm ± 2,0 mm	
Depth of stiffeners	h_r v_s	D.1.3		+3 mm -1 mm +2 -0,15 x v ≤ 1 mm
Position of stiffeners	h_a, h_b, b_k			±3 mm
Widths of flanges	b_s	D.1.5	+2 mm - 1 mm h > 100 mm ± 4,0 mm	+4 mm -1 mm
Cover width	$w_{1, 2, 3}$	D.1.6	± 5,0 mm	
Radius of bends	r	D.1.7	+2 mm - 0 mm	±2 mm
Length of the profile	l		L ≤ 3000 mm + 10 mm -5 mm L > 3000 mm + 20 mm -5 mm	
Deviation of side lap	D	D.1.11	D ≤ ± 2,0 mm on a length of 500 mm	
Longitudinal edge upstand	s		-2 (if s is specified) ≥ 10 mm	
Deflection of flange	f_s		≤ l/300 ≤ 20 mm	
Corner angle flange/web	φ		± 3°	
Lateral curvature	f_q		+ 0,02 x b ≤ 10 mm - 0,01 x b < 10 mm	
Longitudinal corrugation	f_w		b: 400 500 600 f_w: ± 2 mm ± 3 mm ± 5 mm	

Table 3.6: Dimensional tolerances for liner trays, test specimens, type of the test and conditions

Title	Symbols	Test method acc. to EN 508 Annex D	Profiles without stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme	Profiles with stiffeners Values of EN 508 and additional values (grey) of the EPAQ scheme
Hole diameter	d_n		≤ Ø 5 mm ± 0,2 mm > Ø 5 mm + 0,2 mm -0,4 mm In case of additional coating after profiling, the measurement must be done without additional coating.	
Hole pitch	u_x		+2,0 / -1,0 mm	
Offset	v		± 2,0 mm	
Row spacing	u_y		± 2,0 mm	
Edge spacing	e_g, e_s		The minimum values to be complied will be specified during type testing	
Total number of rows (transversal direction)			± 0 The number must be specified by the manufacturer during type testing ± 3% In case of completely perforated sheets	
Total number of rows per meter (longitudinal direction)			± 3% The number must be specified by the manufacturer during type testing	

Table 3.6 (continued): Dimensional tolerances for liner trays, test specimens, type of the test and conditions

3.3.7. Dimensional tolerances for sidings / façade profiles, test specimens, type of the test and conditions

Title	Symbols	Values (grey) of the EPAQ scheme
Sheet thickness	t	Tolerances according to EN 10143, for steel Tolerances according to EN 485-4, for aluminium
Length of the profile (at 20°C) (other temperatures have to be taken into account)	l	$l \leq 3000$ mm ± 5 mm $l > 3000$ mm + 10 mm - 5 mm In one package / batch: max l - min l ≤ 6 mm
Depth of profile	h	$h \leq 50$ mm ± 1,0 mm $50 \text{ mm} < h \leq 100$ mm ± 1,5 mm $h > 100$ mm ± 2,0 mm
Cover width	$w_{1, 2}$	± 3 mm In one package / batch: max w – min w ≤ 4 mm
Cover width difference	w_3	$(w_1 + w_2) / 2 - 2 \leq w_3 \leq (w_1 + w_2) / 2 + 2$
Dimensions of the hanging and/or jointing systemund/oder Verbindungssystems		Defined during the type testing
Width of small flanges (if functional, defined during the type testing)	b_s b_f	Constructional: + 20 mm - 2 mm Functional: + 2 mm - 1 mm
Width of broad flange	b_o	± 2 mm
Longitudinal edge upstand (if defined)	s	+ 0 mm - 1 mm
Corner angle flange/web	φ	± 3°
Lateral curvature (not valid for perforated profiles)	f_q	± 0,005 x b_o
Deviation from squareness	S	$S \leq 0{,}005 \times w$
Deviation from straightness	δ	2 mm / m

Table 3.7: Dimensional tolerances for sidings / façade profiles, test specimens, type of the test and conditions

Title	Symbols	Values (grey) of the EPAQ scheme
Longitudinal corrugation	f_w	L (mm): 200 400 ≥ 700 f_w (mm): 0,6 1,0 1,5
Depth of stiffeners (where is the case)	h_r v_s	$h_r / v_s \leq 6$ mm: + 2 mm - 0,3 x h_r / v_s $h_r / v_s > 6$ mm: + 3 mm - 2 mm
Position of stiffeners (where is the case)	h_a, h_b, b_k	± 3 mm
Deviation of side lap (if visible after installation)	D	D ≤ ± 2,0 mm on a length of 500 mm
Radius of bends	r	For steel: ± 2 mm For aluminium: + 2 mm - 0 mm
In case of perforated profiles:		
Hole diameter	d_n	≤ Ø 5 ± 0,2 mm > Ø 5 mm + 0,2 mm - 0,4 mm In case of additional coating after profiling, the measurement must bedone without additional coating.
Hole pitch	U_x	+ 2,0 mm - 1,0 mm
Offset	v	± 2,0 mm
Row spacing	U_y	± 2,0 mm
Edge spacing	e_g, e_s	The minimum values to be complied will be specified during type testing.
Total number of rows (transversal direction)		± 0 The number must be specified by the manufacturer during type testing. ± 3 % In case of completely perforated sheets
Total number of rows per meter (longitudinal direction)		± 3 % The number must be specified by the manufacturer during type testing.

Table 3.7 (continued): Dimensional tolerances for sidings / façade profiles, test specimens, type of the test and conditions

3.3.8. Dimensional tolerances for standing seam profiles, test specimens, type of the test and conditions

Title	Symbols	Values (grey) of the EPAQ scheme
Sheet thickness	t	Tolerances according to EN 10143, for steel Tolerances according to EN 485-4, for aluminium
Depth of profile	h	$h \leq 50$ mm: ± 1,0 mm $50 \text{ mm} < h \leq 100$ mm: ± 1,5 mm $h > 100$ mm: ± 2,0 mm
Depth of stiffeners	h_r v_s	$h_r / v_s \leq 1{,}5$ mm: + 2 mm; - 0,15 x $h_r / v_s \leq 1$ mm $h_r / v_s > 1{,}5$ mm: h_r: + 3 mm; - 1 mm v_s: + 2 mm; - 0,15 x $v_s \leq 1$ mm
Position of stiffeners	h_a, h_b, b_k	± 3 mm
Dimensions of the seam-locking system		Defined during the type testing
Width of crowns and valleys / broad flange - If the profile has ribs, similar with atrapezoidal profile, width of crowns and valleys: - If the profile has the form of a liner tray, width of broad flange:	b_o, b_u	+2 mm - 1 mm +2 mm - 3 mm
Cover width	w	± 5,0 mm
Length of the profile (at 20°C) (other temperatures have to be taken into account)	l	$l \leq 3000$ mm: + 10 mm - 5 mm $3000 \text{ mm} < l \leq 10000$ mm: + 20 mm - 5 mm $l > 10000$ mm: + 0,002 x l - 0,0005 x l
Radius of bends	r	± 2 mm Additional condition: $r \geq 2$ mm

Table 3.8: Dimensional tolerances for standing seam profiles, test specimens, type of the test and conditions

Title	Symbols	Values (grey) of the EPAQ scheme
Deviation from straightness (for straight profiles)	δ	2,0 mm / m of sheet length
Deviation from straightness (for straight profiles)	S	S ≤ 0,005 x w or S ≤ 5 mm
Deviation of side lap	D	D ≤ ± 2,0 mm on a length of 500 mm
Deflection of flange (where is the case)	f_s	l / 300 ≤ 20 mm
Longitudinal edge upstand (if defined)	s	+ 5 mm - 2 mm
Longitudinal edge width (where is the case)	b_{uf}	± 5 mm
Corner angle flange/web (where is the case)	φ	± 3°
In case of perforated profiles:		
Hole diameter	d_n	≤ Ø 5 mm ± 0,2 mm > Ø 5 mm + 0,2 mm - 0,4 mm In case of additional coating after profiling, the measurement must be done without additional coating.
Hole pitch	U_x	+ 2,0 mm - 1,0 mm
Offset	v	± 2,0 mm
Row spacing	U_y	± 2,0 mm
Edge spacing	e_g, e_s	The minimum values to be complied will be specified during type testing.
Total number of rows (transversal direction)		± 0 The number must be specified by the manufacturer during type testing. ± 3 % In case of completely perforated sheets
Total number of rows per meter (longitudinal direction)		± 3 % The number must be specified by the manufacturer during type testing.

Table 3.8 (continued): Dimensional tolerances for standing seam profiles, test specimens, type of the test and conditions

3.3.9. Dimensional tolerances for tiles, test specimens, type of tests and conditions

Title	Symbols	Test method acc. to EN 508 Annex D	Values of EN 508
Sheet thickness	t		Tolerances according to EN 10143, for steel Tolerances according to EN 485-4, for aluminium
Sheet thickness Depth of tile	h	D.3.2	± 2,0 mm
Web angular displacement	α	D.3.3	± 2°
Pitch		D.3.4	h ≤ 75 mm ± 1,5 mm h > 75 mm ± 1,5 mm or 2% of depth
Widths of crown and valley	b	D.3.5	± 1,0 mm
Cover width	$w_1, _2, _3$	D.3.6	± 0,005 x w
Radius of bends	r	D.3.7	± 1,5 mm
Deviation from straightness	δ	D.3.8	2,0 mm / m of sheet length not exceeding 9 mm
Deviation from squareness	S	D.3.9	± 6,0 mm
Length	l	D.3.10	± 2,0 mm on each step ± 6,0 mm on total length of the tile
Cover width difference	δ	D.3.11	± 2,0 mm/m length ≤ 9 mm

Table 3.9: Dimensional tolerances for tiles, test specimens, type of tests and conditions

3.3.10. Dimensional tolerances for floor deck profiles, type of the tests and conditions

Characteristics	Symbols	Values of EN 1090-4 and additional values (grey) of the EPAQ scheme
Sheet thickness	t	Tolerances according to EN 10143, for steel
Depth of profile	h	$h \leq 50$ mm ± 1,0 mm 50 mm < $h \leq 100$ mm ± 1,5 mm $h > 100$ mm ± 2,0 mm
Depth of dovetail profile	h	± 1,0 mm
Depth of longitudinal stiffeners	h_r v_s	+3 mm -1 mm +2 mm -(0,15 x $v_s \leq 1$) mm
Position of longitudinal stiffeners	b_k, h_a, h_b, h_{sa}, h_{sb}	±3 mm
Upper width and lower width of dovetail stiffeners	w_o, w_u	±3 mm
Difference between the upper width and lower width of dovetail stiffeners	$w_o - w_u$	±0,2 x ($w_o - w_u$) mm
Depth of embossments	d_{emb}	+1 mm -0,5 mm
Position and shape (pitch, obliquity, length, width / diameter) of embossments		± 20 % of the nominal values or stricter tolerances defined during type testing
Depth of transversal stiffeners in flange	h_r	+3 mm -1 mm
Length, width, pitch and position of transversal stiffeners in flange		±3 mm
Pitch of the profile	p	$h \leq 50$ mm ± 2,0 mm 50 mm < $h \leq 100$ mm ± 3,0 mm $h > 100$ mm ± 4,0 mm
Width of crown and of valley	b_o, b_u	+4 mm -1 mm
Width of crown, of valley and of lower opening of dovetail profile	b_{do}, b_{du}, b_{dui}	± 1,0 mm

Characteristics	Symbols	Values of EN 1090-4 and additional values (grey) of the EPAQ scheme
Cover width	$w_{1,2}$	$h \leq 50$ mm ± 5,0 mm $h > 50$ mm ± 0,1 x h $\leq$ 15 mm
Cover width difference	w_3	$(w_1 + w_2)/2$ - tolerance $\leq w_3 \leq (w_1 + w_2)/2$ + tolerance
Radius of bends	r	±2 mm
Crack formation after bending (for organic coated profiles used in environments of corrosivity category C3 to C5)		crack length $\leq$ 2 mm crack length $\leq$ 0,2 mm
Deviation from straightness	δ	2,0 mm / m of sheet length not exceeding 10 mm
Length of the profile (profiles that can be overlapped)	l	$l \leq 3000$ mm + 10 mm -5 mm $l > 3000$ mm + 20 mm -5 mm
Length of the profile (closed shape profiles, which cannot be overlapped)	l	$l \leq 3000$ mm + 0 mm -10 mm $l > 3000$ mm + 0 mm -20 mm
Longitudinal edge upstand (where applicable)	s	$s \geq 10$ mm if s is defined: +5 mm -2 mm
Longitudinal edge width (if the profiles will be stitched)	b_{uf}	$b_u \leq 30$ mm $b_u/2 + 5 \leq b_{uf} \leq b_u - 5$ $b_u > 30$ mm $20 \leq b_{uf} \leq b_u - 5$
Crown curvature	h_e	± 3 mm

Table 3.10 (continued): Dimensional tolerances for floor deck profiles, type of the tests and conditions

3.3.11. FPC and external control procedures for base material

Characteristic	Requirement clause of		Evaluation method		FPC			External control once a year
	EN 14782	EN 1090-1	EN 14782	EN 1090-1	With traceability system but without base material manufacturer's inspection certificate[c] (only EN 14782)	With traceability system and base material manufacturer's inspection certificate[c]	Compliance criteria and specific conditions	Number of specimens
Quality of metal[a]	4.1	-	Visual inspection	-	1[d]	1[d]	Manufacturer's declaration	
Thickness	4.2 and EPAQ	EPAQ	4.2	EN 10346 (for steel)	2[d]	1[d]	Manufacturer's declaration	
Mechanical resistance Yield strength/ grade of metal	4.3	4.1.2 → EN 1090-4, 5.3 (for steel) 4.1.3 → EN 1090-5,5.3 (for aluminium)	EN ISO 6892-1	EN ISO 6892-1	1	-[b]	All test results ≥ manufacturer's stated value (acc. to EN 10346)	3 per type of profile max. 20 per year
Durability/ corrosion protection	4.8	4.9 → EN 1090-4, 5.3, 5.9, 10.1 and Annex E (for steel) and EPAQ 4.9 → EN 1090-5, 10.1 (for aluminium)	4.8 and measurement of the thickness of the coating	EN 1090-4, Annex E	-	-[b]	Declaration or compliance with appropriate national technical specifications	3 per type of profile max. 20 per year

Release of regulated dangerous substances	4.11	-	-	-	-	-	As appropriate when national provisions exist	

a The profile shall be checked directly at the beginning of each production run, change of coil and/or new shift. The following geometrical characteristics shall be checked at the beginning of each run: the cover width, the height of the ribs, length of profile, the distance between two consecutives ribs, longitudinal edge width and type and position of perforated area. The radius of the profile, the position of the stiffeners, the height of stiffeners of any flat part, webs, the width of the flat part and the cut angle of the sheet have only to be checked during external control.

b No direct testing of these characteristics is needed. However, the manufacturer shall check, with a frequency to be defined in the FPC manual, sufficient to ensure that type testing results remain applicable to all products. When using CWFT or deemed-to-satisfy, indirect checks of product parameters may be needed.

c It is not necessary to check all profiles at each external control, it is sufficient to check each type of profile at least within a period of three years.

d No testing required for a given profile if the physical dimensions of the product are subject to regular checking.

Table 3.11: FPC and external control procedures for base material

3.3.12. FPC and external control procedures for profiles

Characteristic	Requirement clause of		Evaluation method acc. to		FPC		External control once a year
	EN 14782	EN 1090-1	EN 14782	EN 1090-1	Minimum number of specimens	Compliance criteria and specific conditions	Number of specimens
Resistance to concentrated forces[e]	4.3	-	Annex B	-	1 per year[d]	All test results ≥ manufacturer's stated value: a span compatible with a force of 1,2 kN (EN 14782)	1 per year[d]
Dimensional tolerances	4.7 und EPAQ	4.2 → EN 1090-4, 11, D.2 (for steel) and EPAQ 4.2 → EN 1090-5, D.2 (for aluminium) and EPAQ	4.7 and EPAQ	5.3 and EPAQ	At each change of profile or material and shift[a]	All test results within the tolerances of the EPAQ scheme	2 specimens for each type of profile, for a thinner and a thicker sheet[c]
Crack formation after bending (for organic coated profiles used in environments of corrosivity category C3 to C5)[f]	-	EN 1090-4, E.2.2.6 and EPAQ	-	EN 1090-4, E.2.2.6 and EPAQ	1 per year, for each organic corrosion protection system for each defined profile type	All test results within the tolerances of the EPAQ scheme	1 per year (randomly selected organic corrosion protection system for a randomly selected profile type)
Water permeability	4.4	- EN 1090-4, A.4.2 (for steel) - EN 1090-5, A.4.2 (for aluminium)	Visual inspections	Visual inspections	Continuous	Pass	-
External fire performance[e]	4.9	-	-	-	-[b]	To ensure production remains representative of type testing samples	-

Reaction to fire	4.10	-	-	-	-[b]	To ensure production remains representative of type testing samples	-

a The profile shall be checked directly at the beginning of each production run, change of coil and/or new shift. The following geometrical characteristics shall be checked at the beginning of each run, where applicable: the cover width, the height of the ribs, the length of profile, the distance between two consecutive ribs, the longitudinal edge width, the type and position of perforated area and the depth of embossments. The radius of the profile, the position of stiffeners, the height of stiffeners on any flat part, on webs, the width of the flat part, the cut angle of the sheet and the position and shape of depth embossments or transversal stiffeners have only to be checked during external control, where applicable.

b No direct testing of these characteristics is needed. However, the manufacturer shall check, with a frequency to be defined in the FPC manual, that type testing results remain applicable to all products. When using CWFT or deemed-to-satisfy, indirect checks of product parameters may be needed.

c It is not necessary to check all profiles at each external control, it is sufficient to check each type of profile at least within a period of three years.

d No testing required for a given profile if the physical dimensions of the product are subject to regular checking.

e Applies only to roofing products.

f Applies only to profiles made of steel.

Table 3.12: FPC and external control procedures for profiles

3.4. Dimensions of profiles

3.4.1. Dimensions of trapezoidal profiles

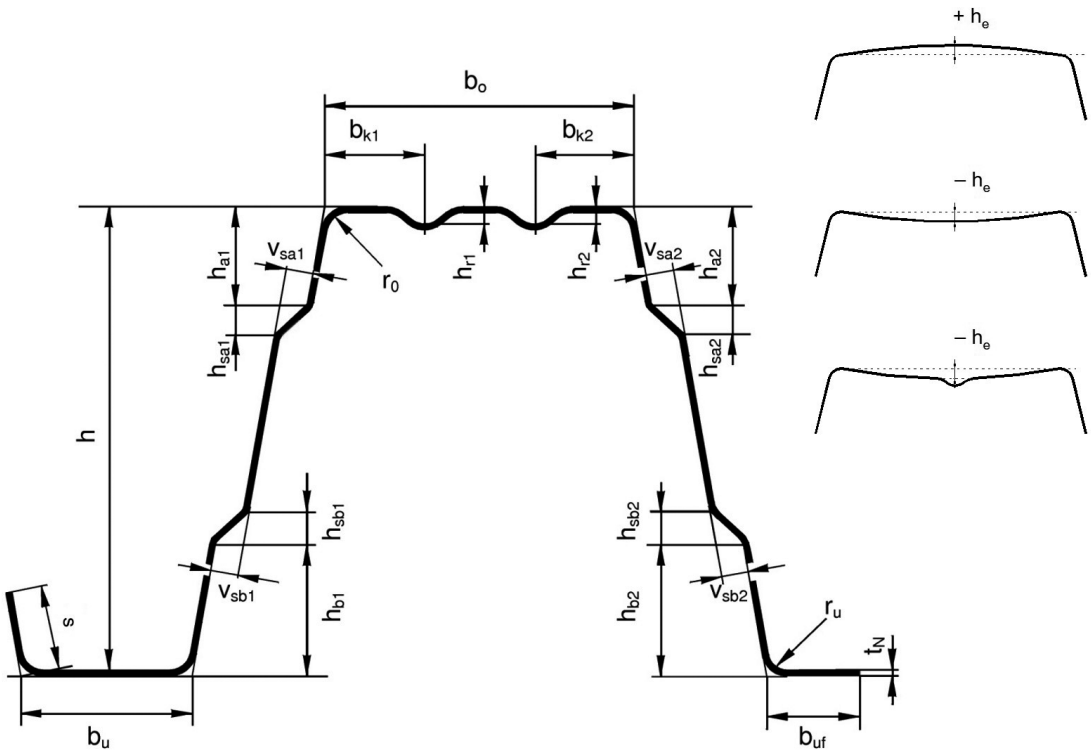


Figure 3.1: Cross section - trapezoidal sheet

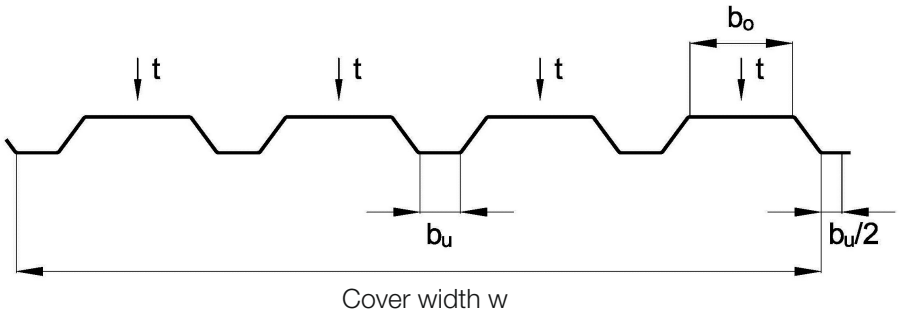


Figure 3.2: Measuring points for sheet thickness t

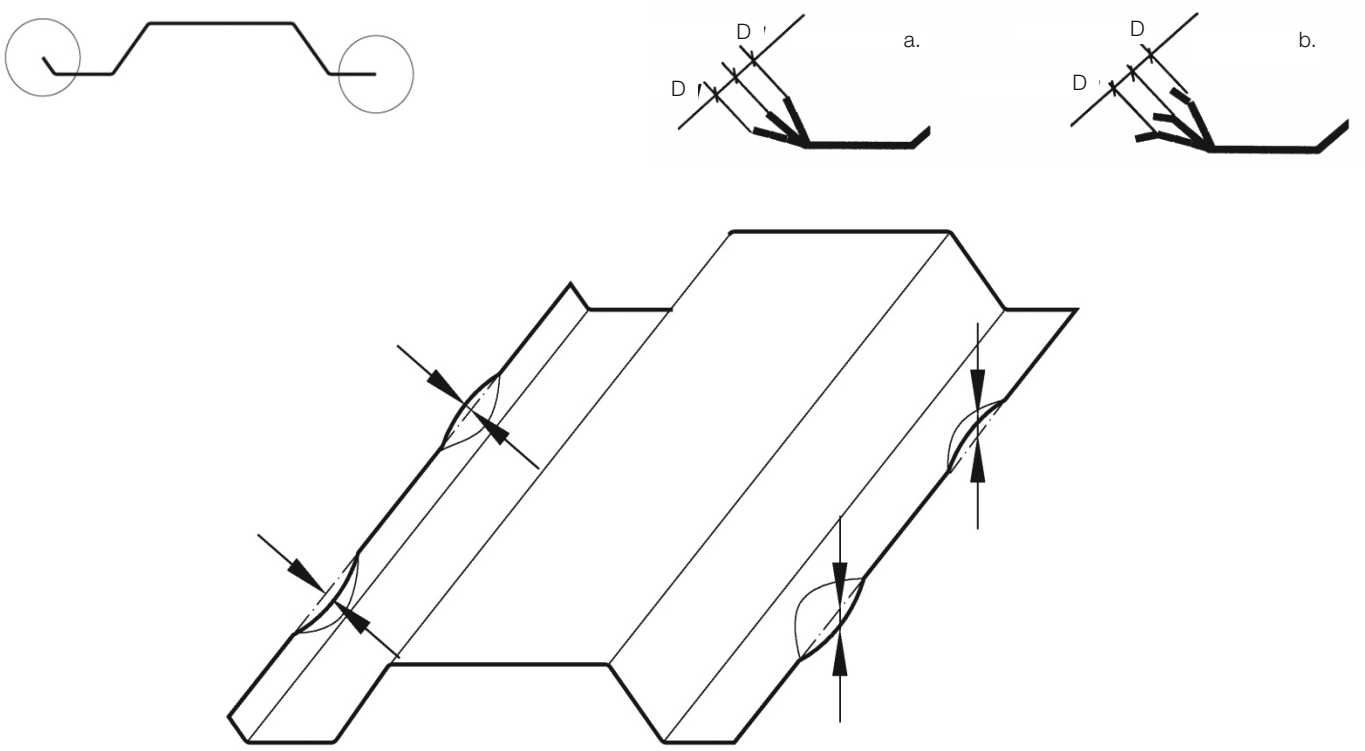


Figure 3.3: Deviation of side lap D (visible side lap)

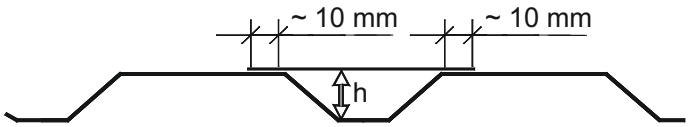


Figure 3.4: Measurement of the depth of profile h

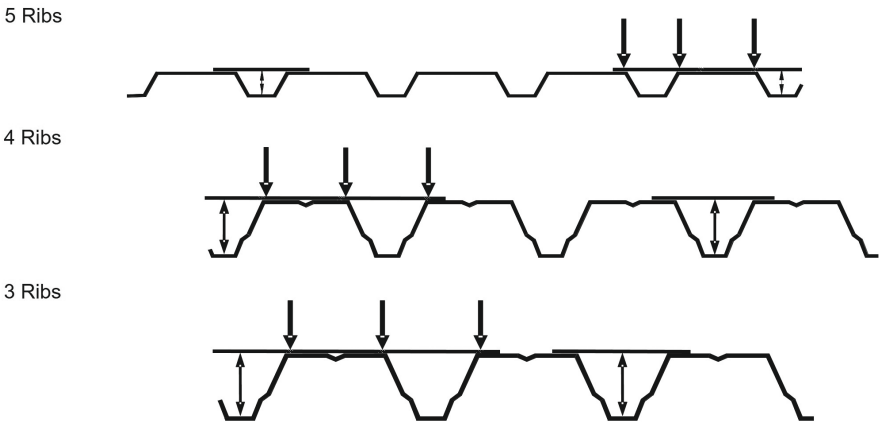
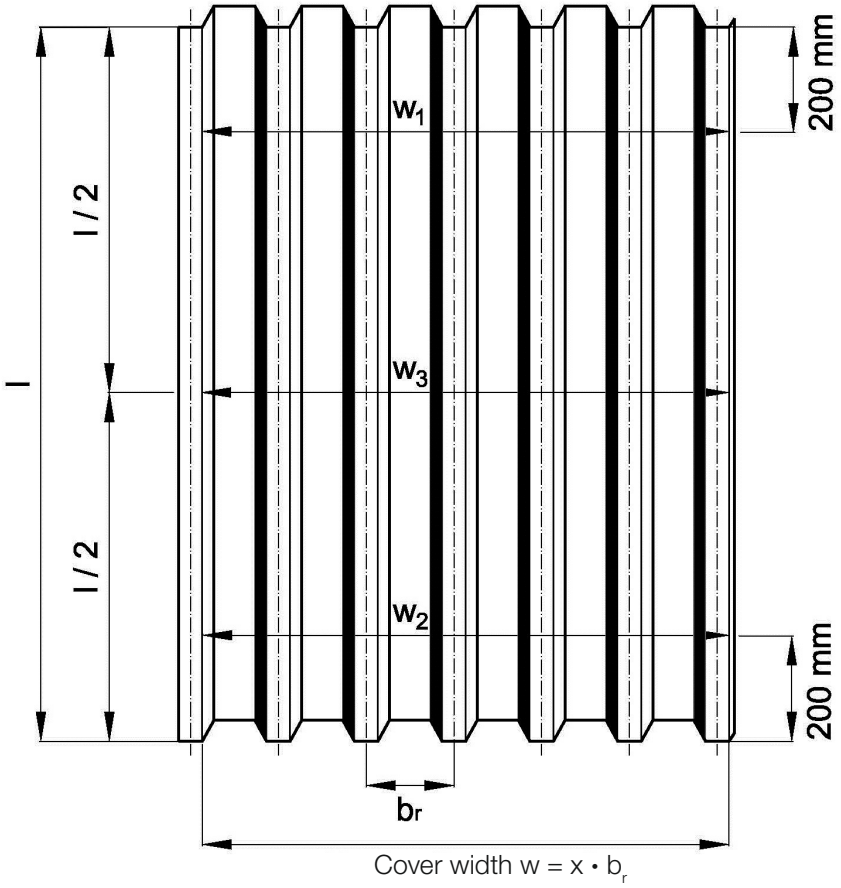


Figure 3.5: Measuring points for depth of profile h



Note: Measurement of length of profile at the middle rib(s)

Figure 3.6: Measurement of the cover width w at both ends and the contraction or bulging w_3 in the middle of the profile

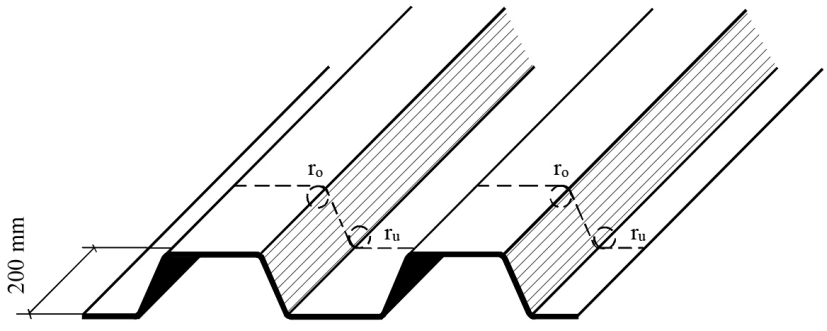
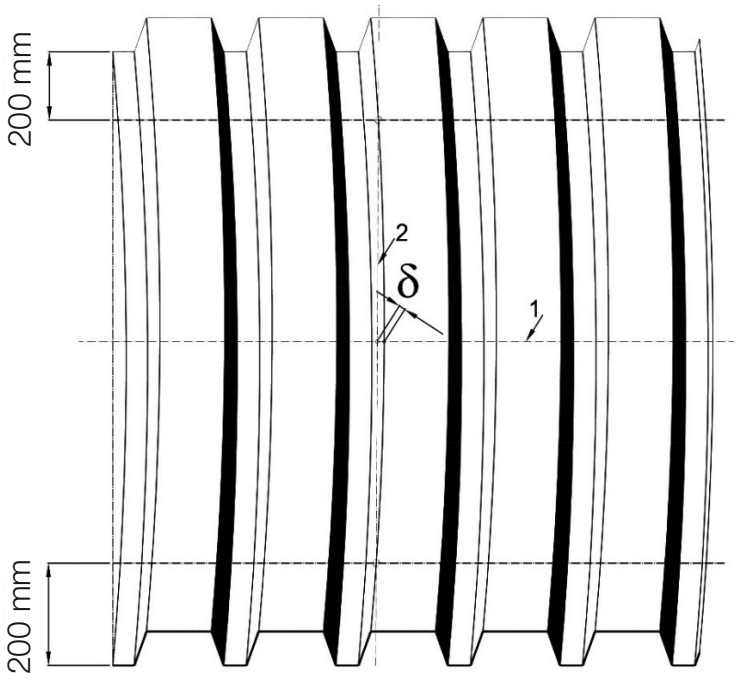


Figure 3.7: Measurement of radius of bends r



1 Central axis
2 Straight line at the edge of crown
δ Deviation of crown from the ideal straight line

Figure 3.8: Measurement of deviation from straightness δ

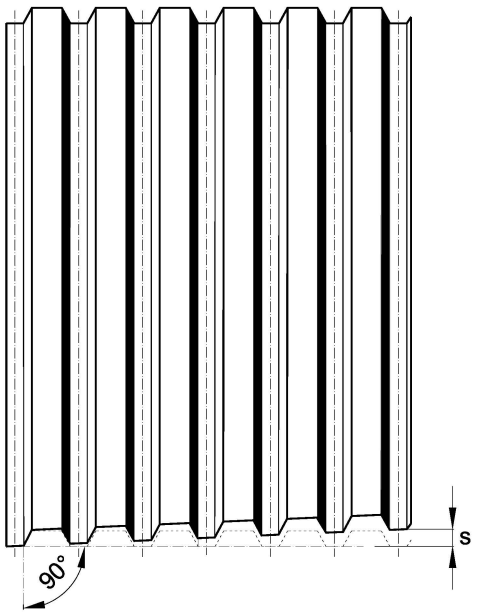


Figure 3.9: Measurement of deviation from squareness S

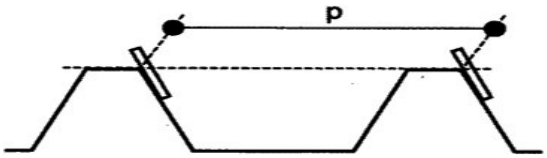
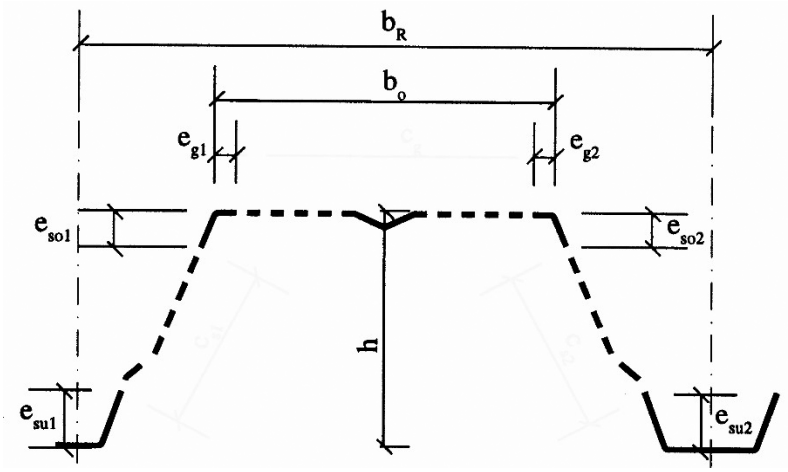
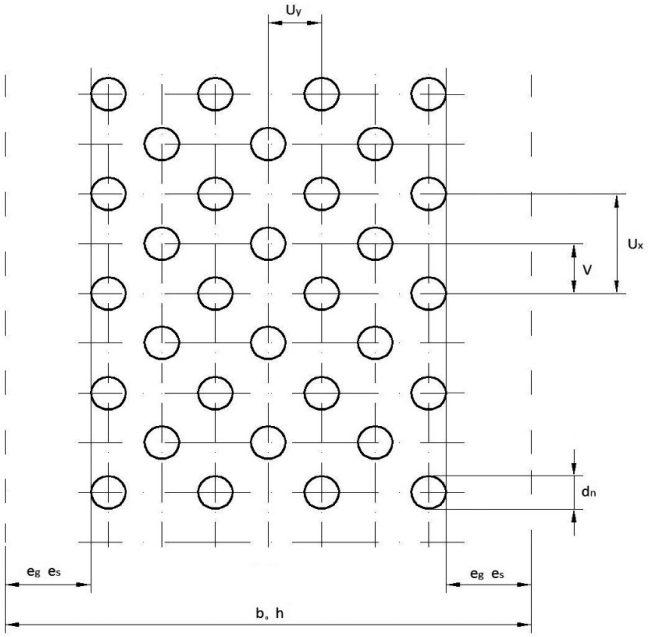


Figure 3.10: Pitch of the profile

Cross section trapezoidal sheet



Holes



d_n = Hole diameter
U_x = Vertical hole pitch
U_y = Horizontal hole pitch

Figure 3.11: Acoustic profiles

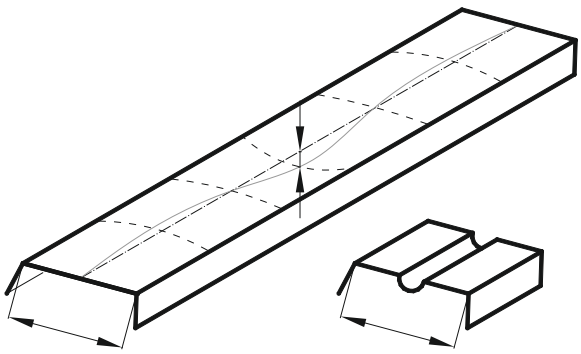


Figure 3.12: Flatness of unstiffened and stiffened flange or web

3.4.2. Dimensions of sinusoidal profiles and tiles

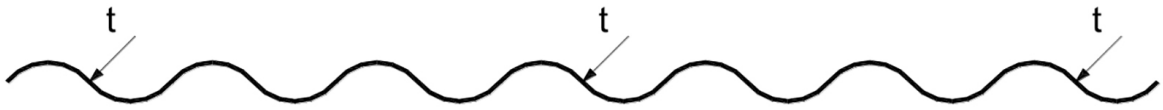


Figure 3.13: Measuring points for sheet thickness t

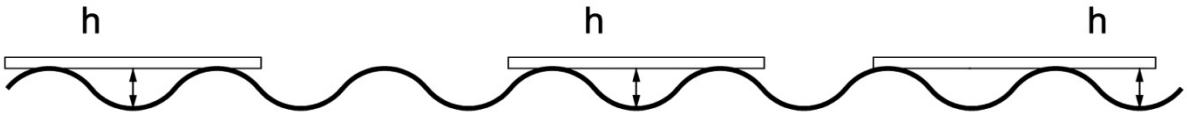


Figure 3.14: Measurement of the depth of profile h

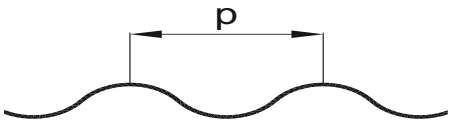


Figure 3.15: Measurement of the pitch of the profile p

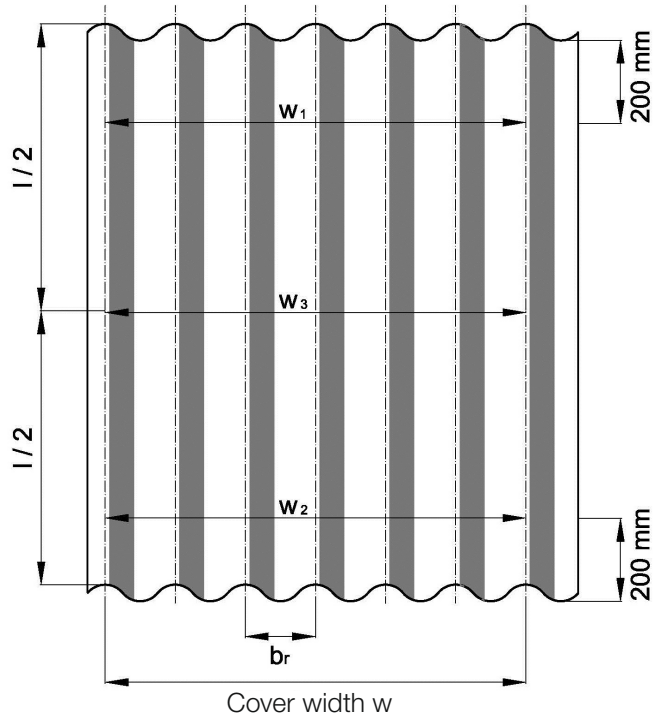


Figure 3.16: Measurement of cover width w at both ends and of the contraction or bulging w_3 in the middle of the profile

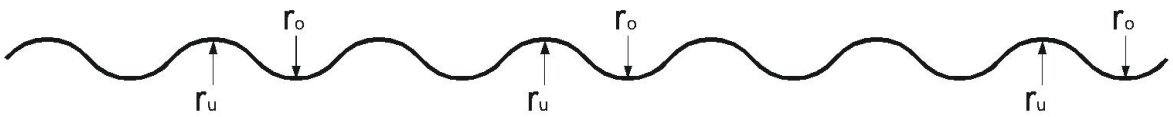


Figure 3.17: Measurement of radius of bends r

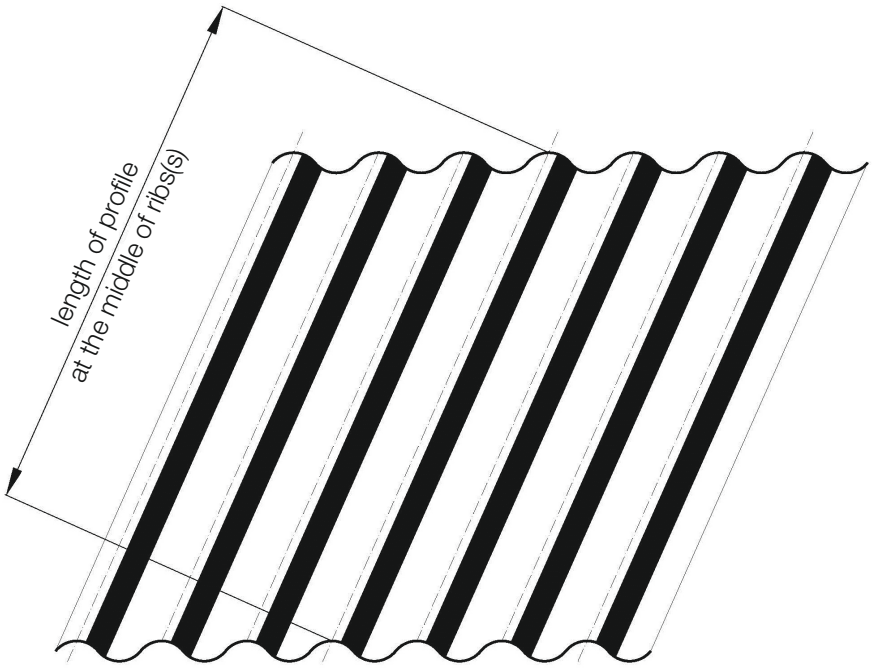


Figure 3.18: Measurement of length of profile at the middle rib(s)

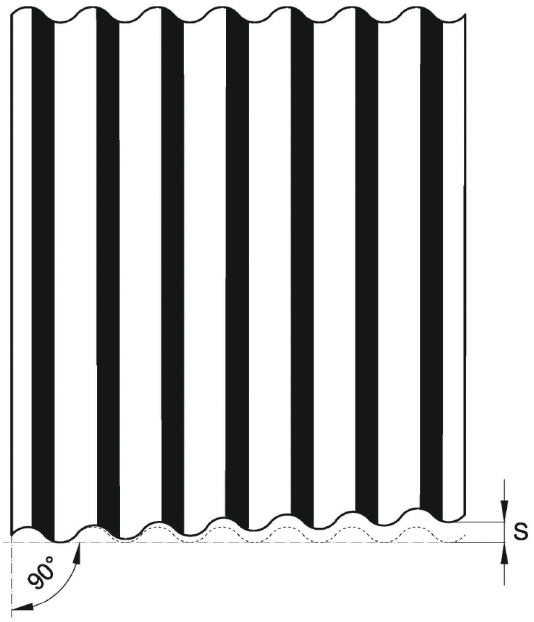


Figure 3.19: Measurement of deviation from squareness S

Figure 3.20: Deviation of side lap D

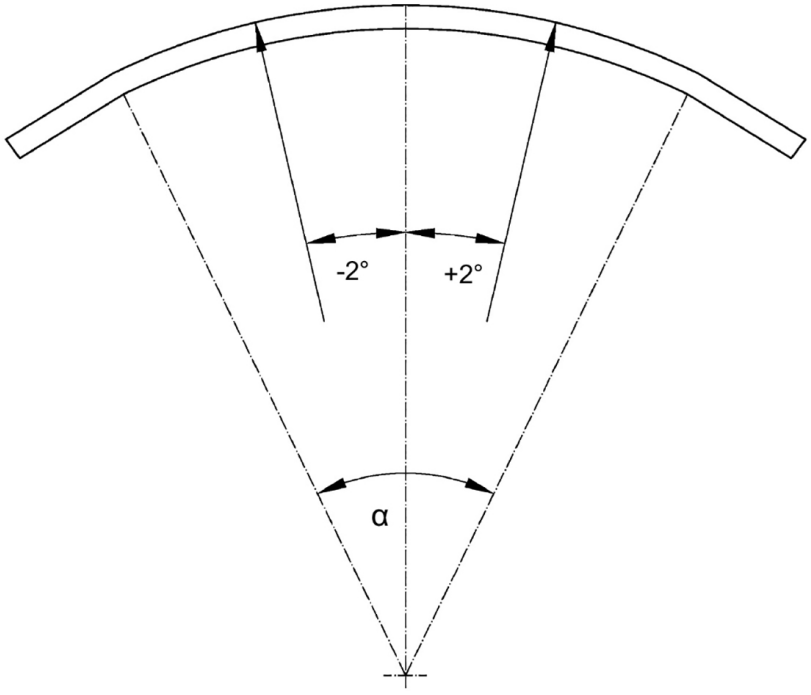


Figure 3.21: Web angular displacement α (only for tile profiles)

3.4.3. Dimensions of liner trays

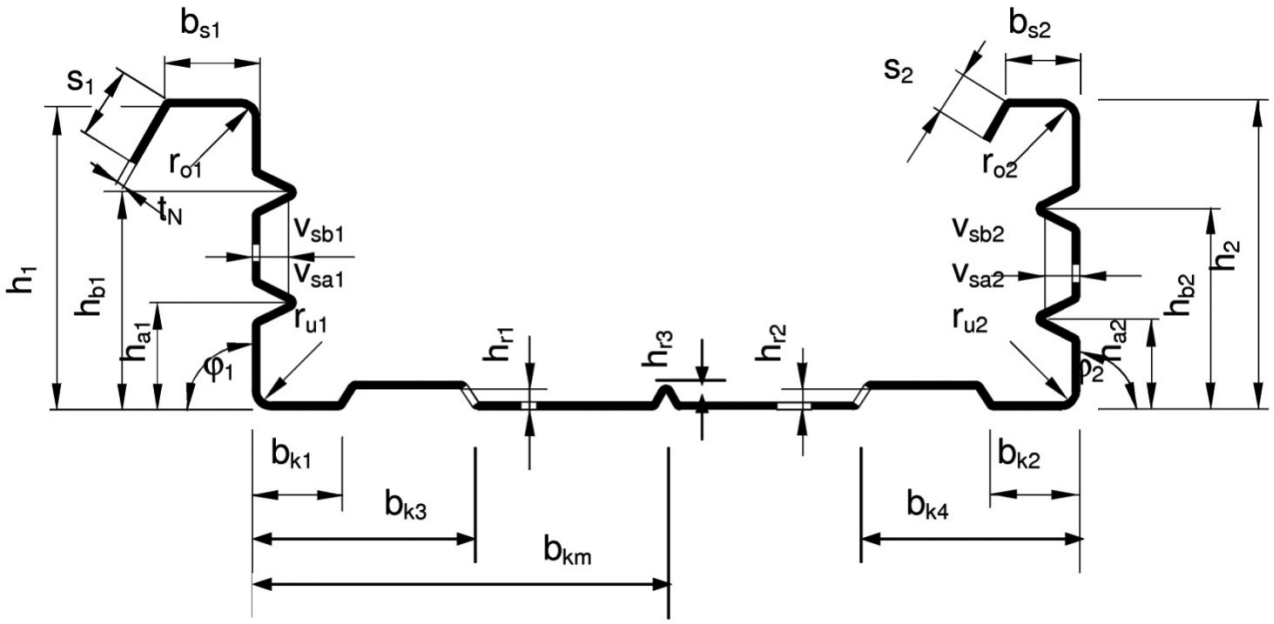


Figure 3.22: Cross section of liner trays

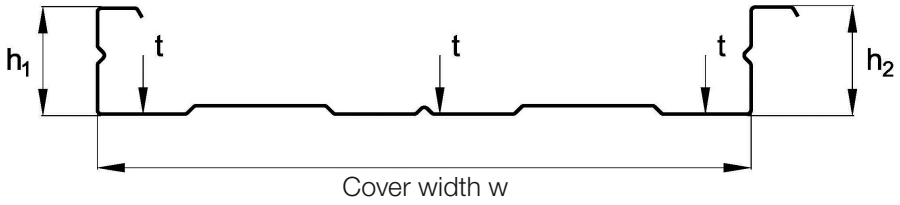
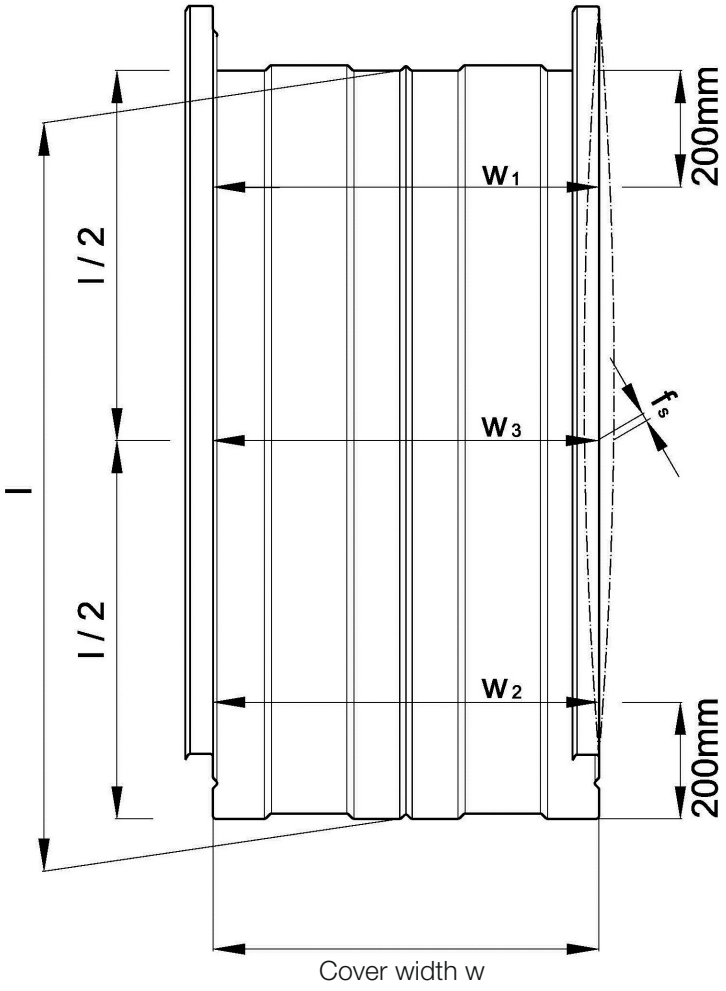


Figure 3.23: Measuring points for sheet thickness t and depth of profile h



Span length L and profile length l for depth of profile:

h ≤ 55 mm: L = 3,00 m

l = 4,00 m

h > 55 mm: L = 5,00 m

l = 6,00 m

Deflection of flange f_s

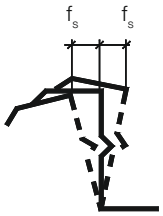


Figure 3.24: Measurement of cover width w, length of profile l and deflection of flange f_s

Figure 3.25: Deviation of side lap D

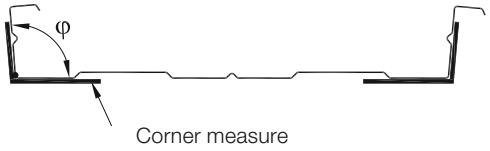
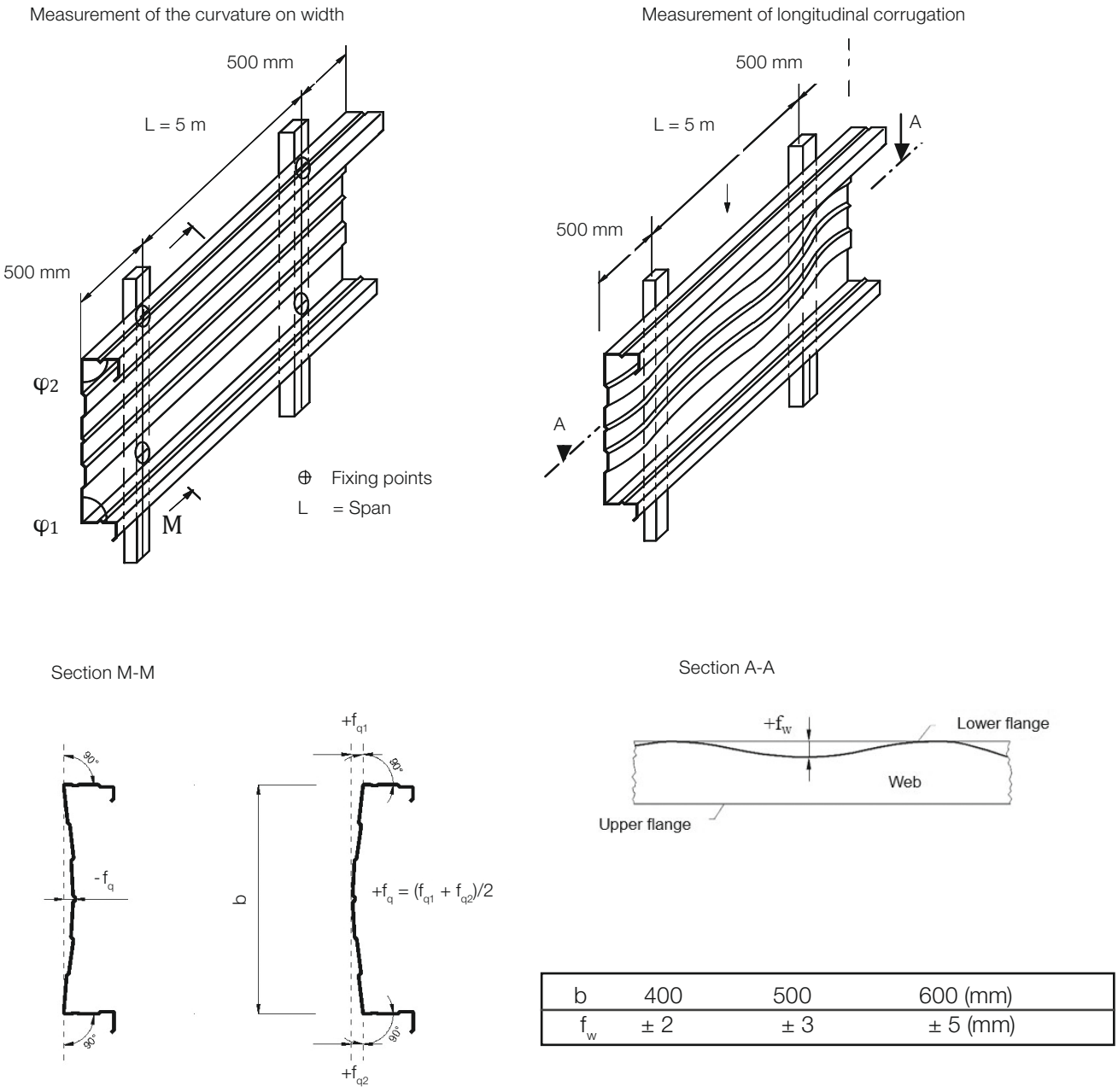


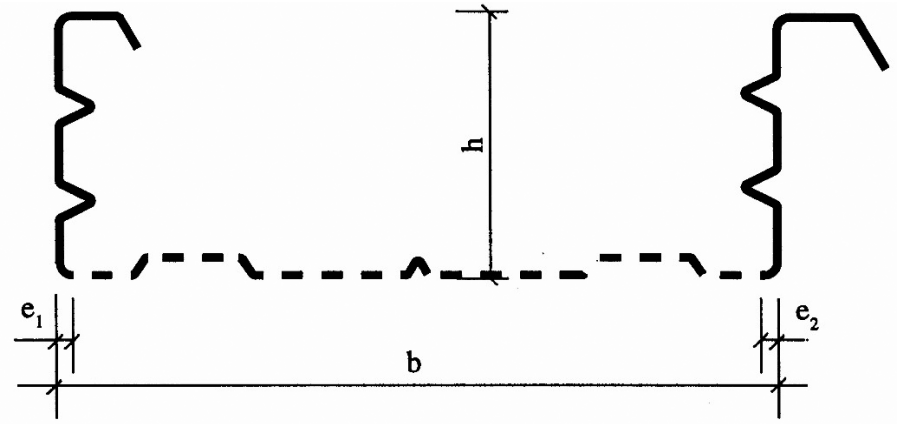
Figure 3.26: Measurement of corner angle flange/web



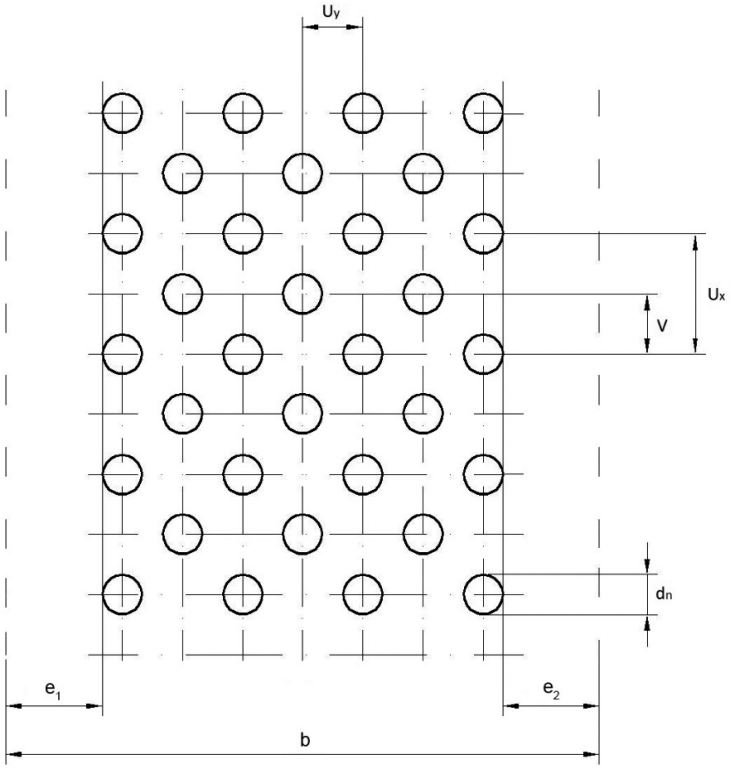
b	400	500	600 (mm)
f_w	± 2	± 3	± 5 (mm)

Figure 3.27: Measurement of the curvature on width and of the longitudinal corrugation

Cross section liner tray



Holes



d_n = Hole diameter

U_x = Vertical hole pitch

U_y = Horizontal hole pitch

Figure 3.28: Acoustic profiles

3.4.4. Dimensions of sidings / façade profiles

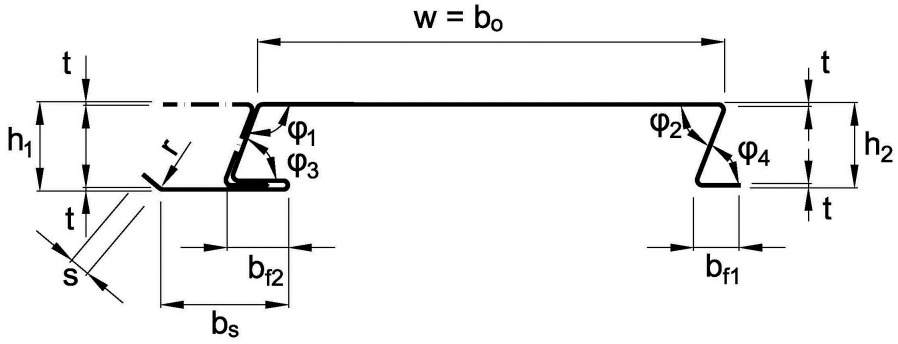


Figure 3.29: Cross section of sidings / façade profiles without shadow gap

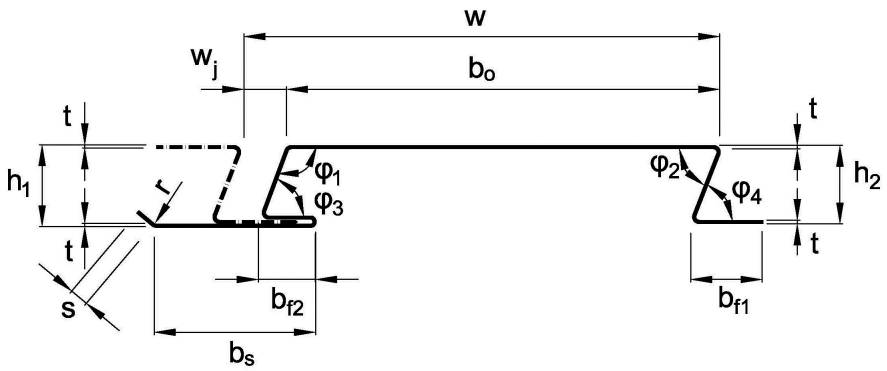


Figure 3.30: Cross section of sidings / façade profiles with shadow gap

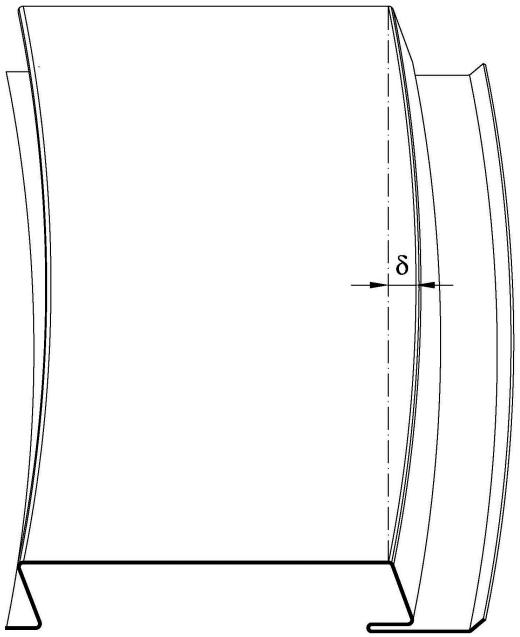


Figure 3.31: Measurement of deviation from straightness δ

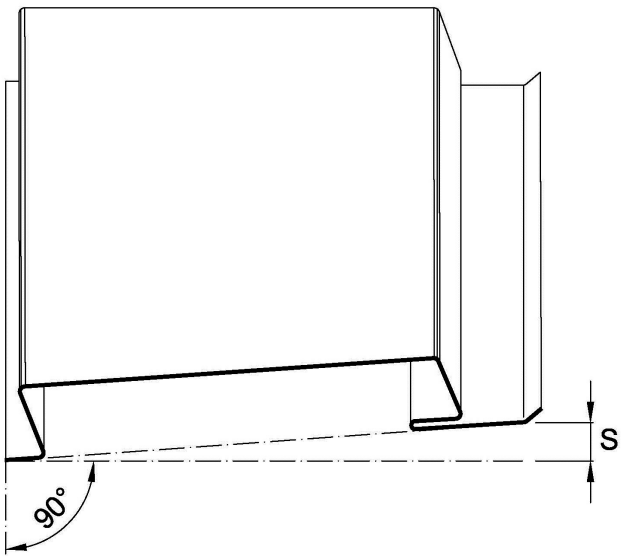


Figure 3.32: Measurement of deviation from squareness

3.4.5. Dimensions of standing seam profiles

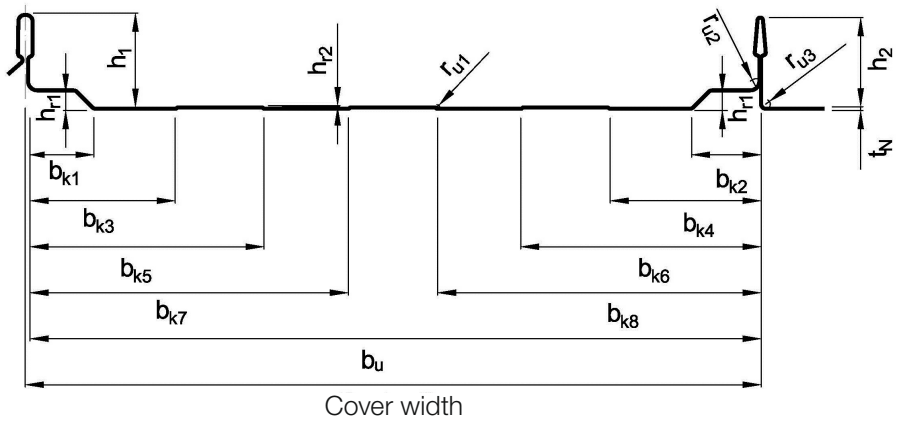


Figure 3.33: Cross section of standing seam profiles – model 1

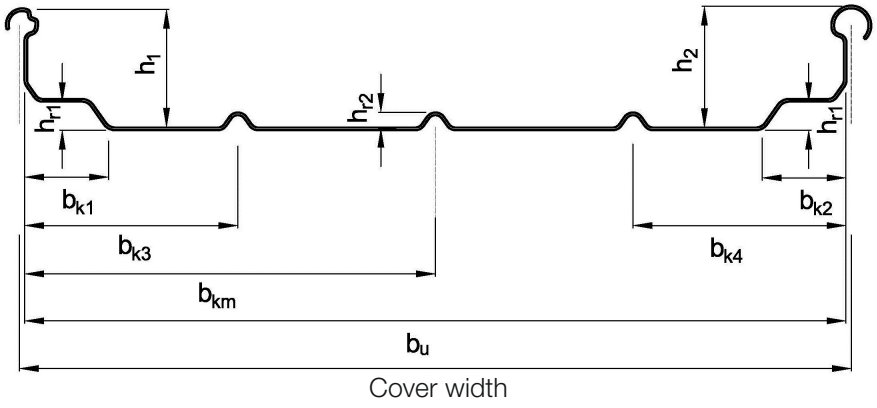


Figure 3.34: Cross section of standing seam profiles – model 2

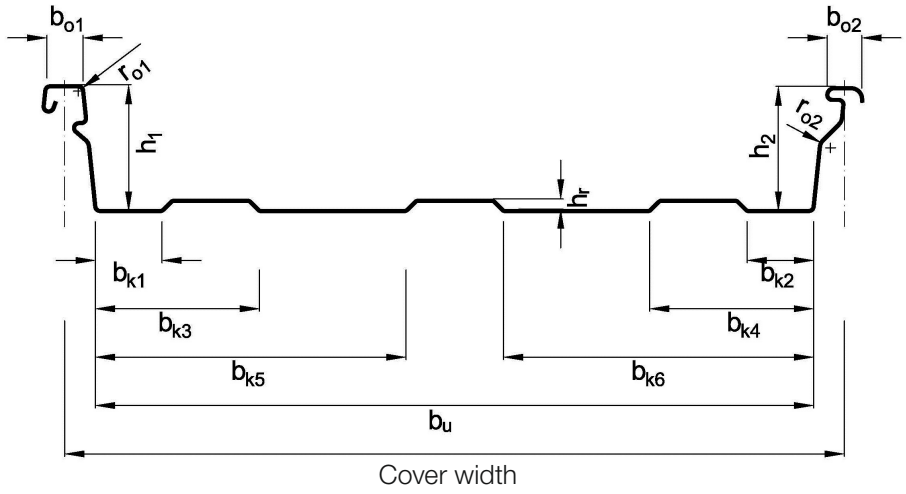


Figure 3.35: Cross section of standing seam profiles – model 3

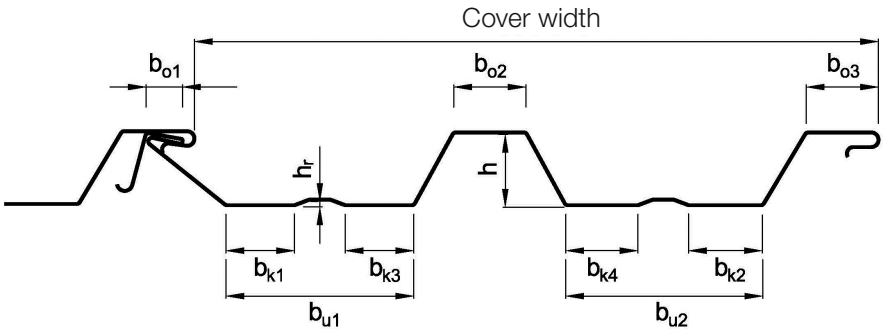


Figure 3.36: Cross section of standing seam profiles – model 4

3.4.6. Dimensions of floor deck profiles

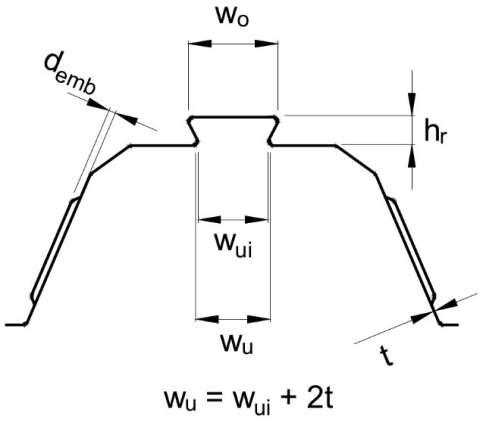


Figure 3.37: Measurement of the upper and lower widths of dovetail stiffeners

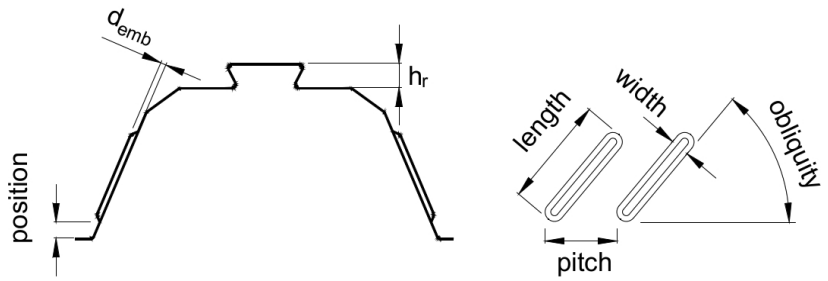


Figure 3.38: Measurement of dimensions related to the position and shape of embossments

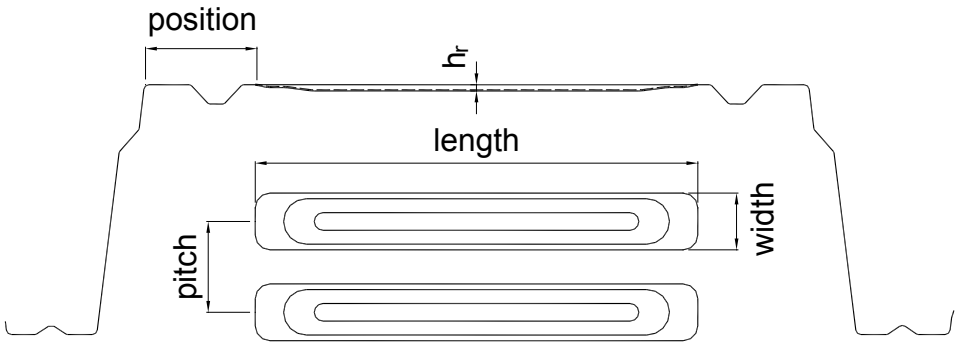


Figure 3.39: Measurement of the depth, length, width, pitch and position of transversal stiffeners in flange

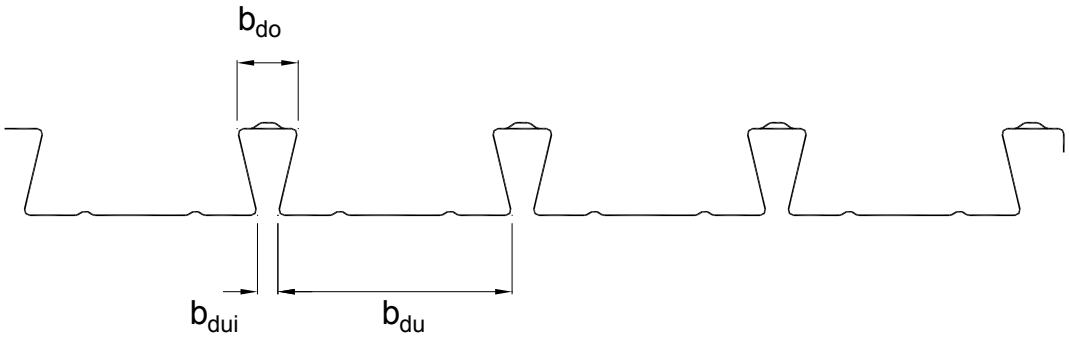


Figure 3.40: Measurement of the crown, of the valley and of the lower opening of dovetail profile