TECHNICAL DOCUMENT

PVC WINDOW PROFILES

Technical document 126-01

Part 1: thickness of the walls of the main profiles

Part 2: co-extruded profiles

Part 3: inspections upon receipt of the certified vinyl compound

Part 4: inspection operations during production

Part 5: inspections and tests on window profiles

Technical document 126-01, rev. 00
13/11/2018

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CSTB
le futur en construction

The CSTB (Centre Scientifique et Technique du Bâtiment), a public establishment supporting innovation in construction, has four key activities: research, expertise, assessment and dissemination of knowledge, organised to meet the challenges of the ecological and energy transition in the construction sector. Its field of expertise includes construction materials, buildings and their integration into districts and towns.

With over 900 employees, its subsidiaries and networks of national, European and international partners, the CSTB Group works for all the stakeholders in the construction sector to advance building quality and safety.

This technical document defines the following technical specifications:

- part 1: thickness of the walls of the main profiles,
- part 2: co-extruded profiles,
- part 3: inspections upon receipt of the certified vinyl compound,
- part 4: inspection operations during production,
- part 5: inspections and tests on window profiles.

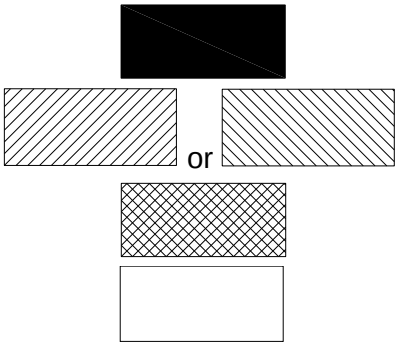
MODIFICATION HISTORY

Parts modified	Revision No.	Effective date	Modifications made
-	00	13/11/2018	Creation of the document

PART 1: thickness of the walls of the main profiles

Class B as defined in the NF EN 12608-1 standard is the one used for wall thicknesses. Thicknesses are measured in accordance with the NF EN 12608-1 standard.

The diagrams of profiles in this technical document are examples of existing profile configurations. The legend with minimal thickness requirements provided below must be reproduced on the plans of the profiles covered by a certification application.



→ 2.5 mm

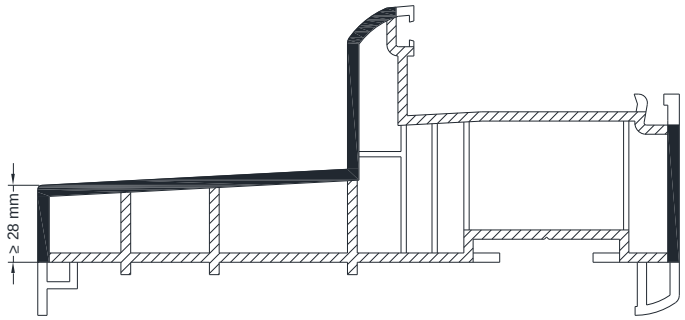
→ 2.0 mm

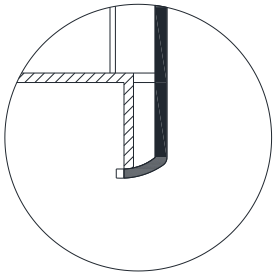
→ 1.5 mm

→ no requirement

- ***Wide frame***

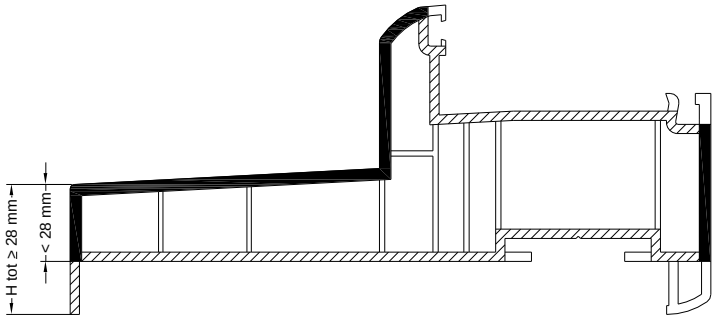
If the profile is trimmable, the interior walls that appear after trimming must have a minimum thickness of 2 mm.

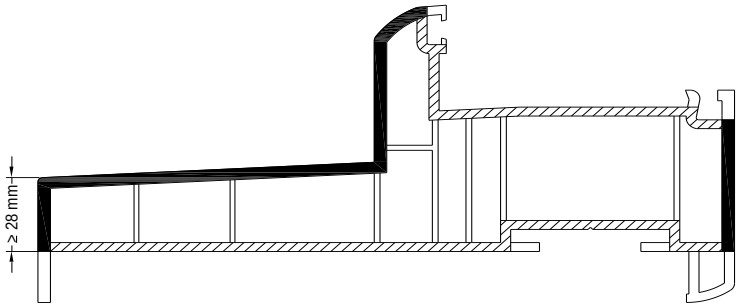




variant

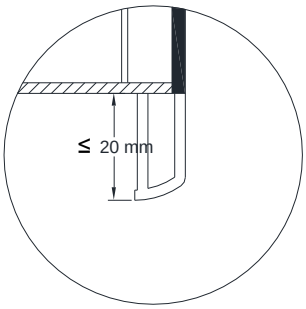
The thickness requirement is different depending on the height of the frame edge.

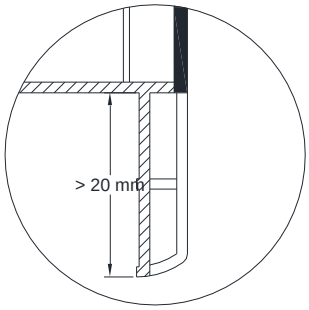




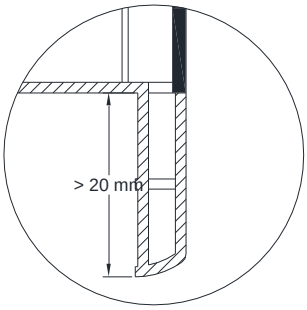
- ***Frame covering strip for retrofit/renovation***

The thickness requirement is different depending on the length of the covering strip.

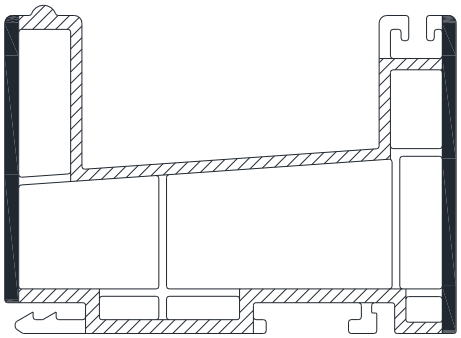




or

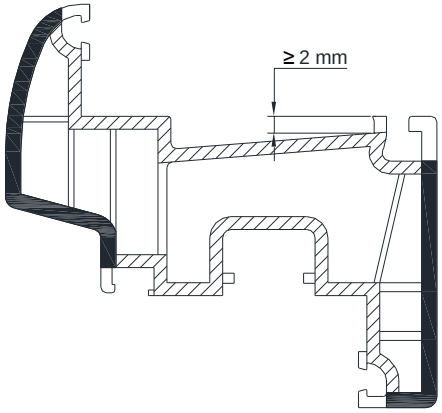


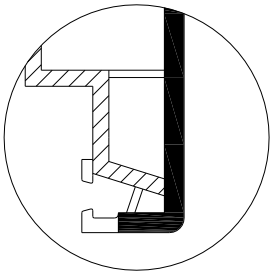
- ***Sliding frame***



- ***Water seal***

The stop of the water seal must have a minimum height of 2 mm (except in case of special provisions).

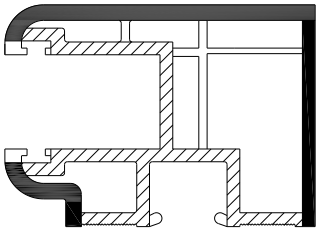




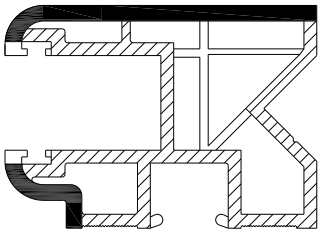
variant

- ***Rolling shutter slide used as furring***

reversible profile

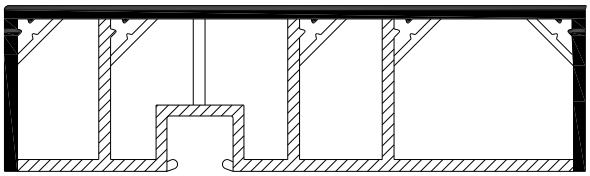


non-reversible profile

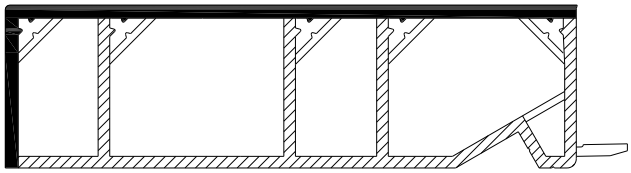


- ***Furring***

reversible profile



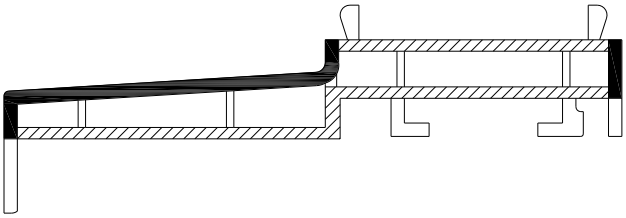
non-reversible profile



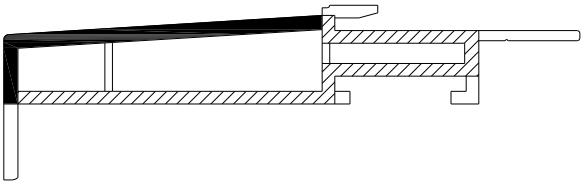
If the profile is trimmable, the interior walls that appear after trimming must have a minimum thickness of 2 mm.

- ***Closed sill***

general case

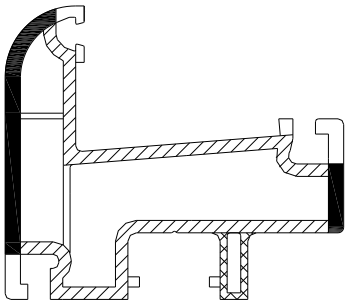


rear face required to be covered

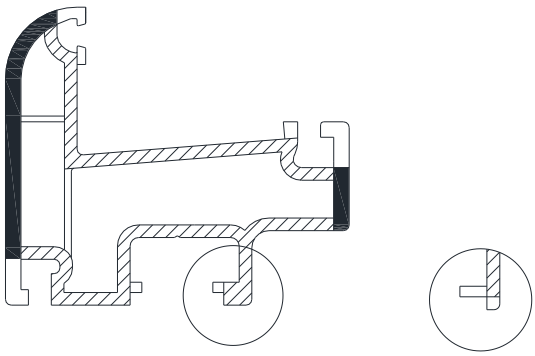


- ***Central stile forming main profile, as cover strip or for aesthetic purposes***

If the central stile profile has a recess that can receive a hardware element, it is considered to be a main profile.

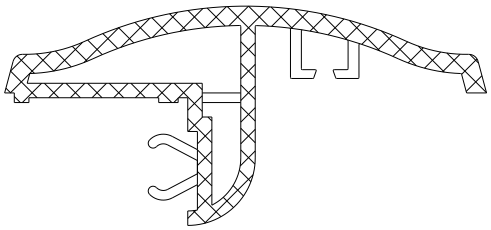


1.5 mm minimum



variant

If the central stile profile serves as a cover strip (with or without seal groove), the minimum thickness of the outer walls and other walls is 1.5 mm. It is then considered to be an accessory profile.



1.5 mm minimum

If the central stile profile is only for aesthetic purposes, there is no minimum thickness requirement.

- ***Weldable profiles***

The walls of the drainage chambers in weldable profiles shall not deviate from their nominal position beyond a value equal to their thickness.

PART 2: co-extruded profiles

The following provisions complement the ones set out in the NF EN 12608-1 standard.

➢ ***Example configurations***

certified virgin material and/or internally reprocessed material

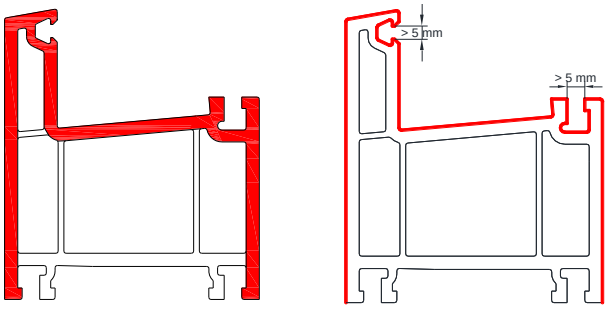
non-UV-resistant certified virgin and/or reprocessed and/or recycled material defined in standard NF EN 12608-1

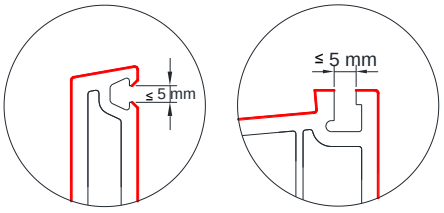
other permitted materials included in the certification reference system:

- material from vinyl compounds declared in a DTA intended for profiles which will be have a coating
- certified vinyl compound containing no more than a maximum of 5% by weight of plasticised PVC or other type of seal material (compatibility must be corroborated on a case-by-case basis and process control must be verified)
- QB 34 (or equivalent) certified vinyl compound for which L*< 82

Opening leaf

Frame

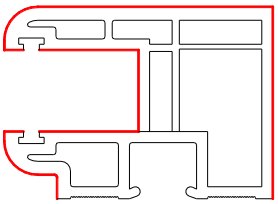




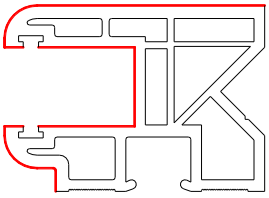
special provisions if the width of the seal carrier recess and/or glazing bead groove is ≤ 5 mm

Slide

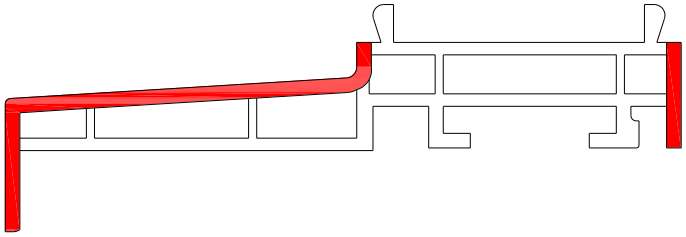
reversible profile



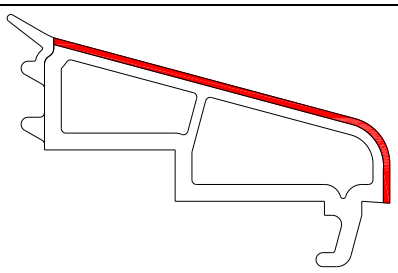
non-reversible profile



Closed sill



Glazing



PART 3: inspections upon receipt of the certified vinyl compound

Applicants/holders are required to carry out an inspection of all components used in the manufacture of their certified products upon reception and in all cases prior to use.

The internal “reception” inspection established by the applicant/holder shall cover:

- inspection methods for products upon receipt that assess their compliance and/or regularity with regard to the expected characteristics,
- the sampling rules for the sampled products, where appropriate.

These inspections, the content of which may vary according to the applicant/holder’s internal inspection structure and the guarantees of regularity provided by the suppliers, generally include:

- an inspection upon receipt enabling the delivery to be accepted,
- a quality check to assess their compliance and/or regularity with regard to the expected characteristics.

The methods, frequencies and results of the inspections will be verified during the NF mark admission visit and will be monitored by CSTB.

➢ *Case 1: extruder that does not manufacture the certified vinyl compound used for the extrusion of their profiles*

The extruder uses the certified vinyl compound from a producer that holds the QB certification “Vinyl compounds and their manufacture for PVC window profiles” (QB 34) or equivalent (identical certified characteristics and assessment procedures) or has a mixture made to order by a producer that holds the QB certification “Vinyl compounds and their manufacture for PVC window profiles” (QB 34) or equivalent.

The extrusion unit shall carry out an inspection upon receipt of the vinyl compounds provided, including:

- verification of the sheets and certificates of conformity delivered with each batch,
- a check of the extrudability of the vinyl compounds provided, by means of a trial extrusion (designated production extruder or laboratory extruder) and a colorimetry measurement (cf. part 5 of this technical document).

The vinyl compound production unit may carry out a trial extrusion on a designated production extruder or a laboratory extruder. If so, extrusion units do not need to conduct this test. The analysis sheet submitted with each batch delivered must include deviations in colorimetric characteristics (set out in the specifications to which each of the parties agreed).

➢ *Case 2: extruder that manufactures the certified vinyl compound used for the extrusion of their profiles*

Extruders which manufacture the vinyl compound themselves are routinely monitored by CSTB. They are required to carry out an inspection of all components used in the manufacture of their vinyl compound upon receipt and in all cases prior to use. They must corroborate the quality of their products according to the provisions described in the QB certification reference system for “Vinyl compounds and their manufacture for PVC window profiles” (QB 34) or equivalent.

PART 4: inspection operations during production

Inspections during production shall be arranged by the applicant/holder.

They apply to the product in its intermediate states at the main production stages, as well as compliance with the setting instructions for the production tools (production machines, equipment, etc.).

Inspection instructions shall be formalised and made available to the operators.

The results of the inspections are recorded upon each inspection.

If these results indicate that the product does not meet the requirements of this certification reference system, the necessary corrective actions must be implemented immediately.

PART 5: inspections and tests on window profiles

Applicants/holders are required to verify the characteristics of the finished products before delivery and are responsible for arranging this inspection. Inspections of finished products are carried out by the applicant/holder itself in the laboratory of the manufacturing unit, at the production site.

Inspections and tests of finished products manufactured by the applicant/holder are carried out in accordance with the NF EN 12608-1 standard and the specifications in this technical document. The various characteristics to be inspected are measured according to the operating procedures defined in the NF EN 12608-1 standard and in this technical document.

The applicant/holder must take random samples during production in order to carry out inspections and tests in accordance with the NF EN 12608-1 standard and the specifications in this technical document.

The method for collecting the samples required for testing must be clearly specified in the applicant's/holder's quality plan and must not be left to the sole discretion of the operator.

Applicants/holders shall record the results of these inspections. If the results of the standard inspections are inconclusive, the inspections must be strengthened and the causes of the fault must be identified so that corrections can be made, by carrying out production controls if necessary.

The applicant/holder shall monitor the consistency and the compliance of each characteristic by means of tables or graphs. A statistical analysis of the data shall be performed in order to prevent any deviations in the manufacturing process and carry out the necessary corrective actions.

Non-compliant profiles cannot receive any dispensation and shall be discarded.

The frequency of tests and the product sampling procedure are defined in the following table.

TESTS	SAMPLING AND FREQUENCY
appearance linear density thickness of exterior walls(1)	once per station per extruder
resistance to impact by falling mass(2)	1 test every 48 hours on 5 specimens taken from the same bar per extruder (or a minimum of 1 time per production campaign)
heat shrinkage(3)	1 test every 48 hours on 3 specimens taken from the same bar per extruder (or a minimum of 1 time per production campaign)
appearance after conditioning at 150°C(4)	1 test per week on 2 specimens taken from the same bar per extruder (or a minimum of 1 time per production campaign)
colorimetry(5)	1 test per station on 2 specimens taken from the same bar per extruder
straightness deviation	1 test per station on 2 specimens taken from the same bar per extruder

- ***(1) Thickness of exterior walls***

Class B as defined in the NF EN 12608-1 standard is the one used for wall thicknesses.

For co-extruded profiles, a colouring agent shall be added to one of the two materials (at all times or at the start of each campaign) to facilitate the measurement of their thicknesses. The measurement frequency shall be at least once every 24 hours per extruder.

- ***(2) Resistance to impact by falling mass***

Class B as defined in the NF EN 12608-1 standard is the one used for main profiles, except for profiles with a rounded configuration (class 0, test not performed).

The test is preferably performed in such a way that the point of impact is along the axis of the widest chamber adjacent to a visible surface. There shall be no breaks in any of the 5 specimens. Failing this, the quantity shall be increased to 10 specimens and the evaluation shall proceed according to the NF EN 12608-1 standard on all 10 specimens. In this case, no more than one specimen shall show a break.

A drop height of 1500 mm is accepted for units which use this provision as part of the checks for another certification. If the test result is not satisfactory at this height, the test will have to be carried out again at a drop height of 1000 mm on 5 specimens. There shall be no breaks in any of the 5 specimens.

- ***(3) Heat shrinkage***

In case of double extrusion, the heat shrinkage test is carried out on both outlets.

- ***(4) Appearance after conditioning at 150°C***

For co-extruded profiles, this test serves to check whether there is any separation between the profile's core and its exterior. The test frequency shall be at least once every 24 hours per extruder.

- ***(5) Colorimetry***

Colorimetry is measured with a field of observation of 2°.

The surface of the new profile to be tested shall be cleaned beforehand with ethanol. After drying, the colorimetry is measured at three points. The result is the numerical average of each component L*, a* and b* provided by the apparatus.

It is only acceptable for this test to be carried out with an observation field of 10° if correlation has been established between the colorimetric specifications at 2° and those at 10° (applies only to production checks).

- ***Adhesiveness of co-extruded/post-extruded sealing profiles***

The adhesiveness test is not performed on post-coextruded sealing profiles if they can be replaced by a sealing profile installed in the seal carrier recess.

This test is always performed on all "lip"-type co-extruded sealing profiles.

The shear is characterised: cohesive or adhesive.

The shear force must be cohesive. The shearing force is not recorded.

An incipient shear measuring at least 10 mm is created on a profile sample measuring at least 200 mm at the window profile/seal profile interface and the interface is manually subjected to a perpendicular pulling force.

- ***Accessory profiles***

The tests for resistance to impact by falling mass and appearance after conditioning at 150°C shall not be carried out on these profiles.

- ***Base structure panel***

The test for appearance after conditioning at 150°C shall not be carried out on the base structure panel.

The test for resistance to impact by falling mass is carried out in accordance with the NF EN 477 standard, but with a drop height of 600 mm.