

**Determination of installed thermal resistance into a roof and into a wall of
ATI PRO Excellence Permeable according to EN ISO 6946:2017**

(test name)

Test method: Determination of installed thermal resistance into a roof and into a wall of ATI PRO Excellence Permeable according to EN ISO 6946:2017
(number of normative document or test method, description of test procedure, test uncertainty)

Product name: ATI PRO Excellence Permeable
(identification of the specimen)

Customer: SAS ATI FRANCE, 146 Avenue du Bicentenaire – FR-01120 Dagneux, France
(name and address of enterprise)

Manufacturer: SAS ATI FRANCE, 146 Avenue du Bicentenaire – FR-01120 Dagneux, France

Calculation results:

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Roof slope angle, α	Calculation method reference no.	Calculation result, R , $(m^2 \cdot K)/W$
Flat roof ($\alpha = 0^\circ$)	EN ISO 6946:2017	4.04
Pitched roof ($\alpha = 30^\circ$)		4.09
Pitched roof ($\alpha = 45^\circ$)		4.12
Wall ($\alpha = 90^\circ$)		4.27
<i>R value for others pitched sloop (different α value) can be determined by linear interpolation between two calculated R values</i>		

Calculation made by: Building Physics Laboratory, Institute of Architecture and Construction of Kaunas University of Technology
(Name of the organization)

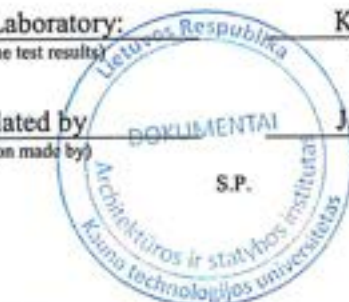
Products used in calculation: Ventilated air layer 20 mm (external surface resistance R_{se}).
Metallized membrane, $\varepsilon = 0.25^*$.
Multilayer reflective insulation product **APRO** (test report no. 065 SF/23 U).
Metallized reinforced perforated film, $\varepsilon = 0.15^*$.
Unventilated air layer 20 mm;
* Declared by the manufacturer

Additional information: Application, 2023-04-06

Annex: Annex I. Calculation results
(the numbers of the annexes should be pointed out)

Head of Laboratory: K. Banionis
(approves the test results) (n., surname)

Calculated by: J. Ramanauskas
(calculation made by) (n., surname)



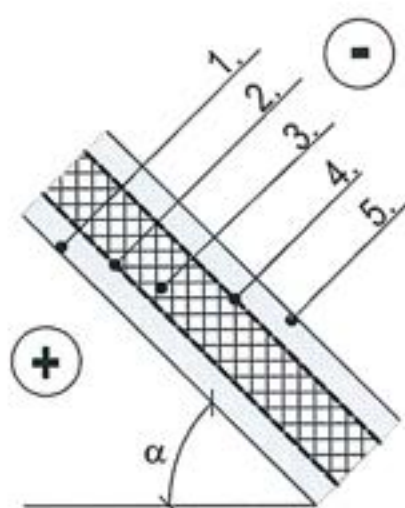
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Validity – the named data and results refer exclusively to the tested and described specimens.
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Annex 1: Calculation results

Table 1: Products R- values

Product	Thermal resistance R , (m ² ·K)/W
APRO (test report n° 065 SF/23 U)	$R_{core90/90} = 3.52$
"$R_{core90/90}$" is the declared R core value following EN 16012 + A1. "$R_{core90/90}$" is calculated on 4 results of 4 samples came from 4 different fabrication dates following EN 16012 + A1 (and using the fractile 90/90 calculation rules $S_{R-prod} = \sqrt{\frac{\sum (R_i - R_{average})^2}{n-1}}$).	



Temperature regime 20°C / 0°C	
1.	Unventilated Air cavity #1, 20 mm
2.	Metallized reinforced perforated film, $\epsilon_1 = 0.15$ 230406 Emissivité Film armé micro-perforé
3.	APRO, 100 mm
4.	Metallized membrane, $\epsilon_2 = 0.25$ 230406 Emissivité Ecran HPV métallisé
5.	Ventilated Air cavity #2, 20 mm

Figure 1. Roof construction design

Table 2: Roof construction calculation results for slope $\alpha = 0^\circ$ (EN ISO 6946)

ATI PRO Excellence Permeable installed on roof			
Angle: $\alpha = 0^\circ$	Layer	R value	Unit
Ascendant Heat Flux (Winter period)	Unventilated Air cavity # 1	0.3593	m ² ·K/W
	Metallized reinforced perforated film		
	APRO	3.52	m ² ·K/W
	Metallized membrane		
	Ventilated Air cavity # 2 (the thermal resistance of external surface R_{se})	0.1621	m ² ·K/W
	R Total	4.04	m²·K/W

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Table 3: Roof construction calculation results for slope $\alpha = 30^\circ$ (EN ISO 6946)

ATI PRO Excellence Permeable installed on roof			
Angle: $\alpha = 30^\circ$	Layer	R value	Unit
Ascendant Heat Flux (Winter period)	Unventilated Air cavity # 1	0.3922	$\text{m}^2 \cdot \text{K/W}$
	Metallized reinforced perforated film		
	APRO	3.52	$\text{m}^2 \cdot \text{K/W}$
	Metallized membrane		
	Ventilated Air cavity # 2 (the thermal resistance of external surface R_{se})	0.1764	$\text{m}^2 \cdot \text{K/W}$
	R Total	4.09	$\text{m}^2 \cdot \text{K/W}$

Table 4: Roof construction calculation results for slope $\alpha = 45^\circ$ (EN ISO 6946)

ATI PRO Excellence Permeable installed on roof			
Angle: $\alpha = 45^\circ$	Layer	R value	Unit
Ascendant Heat Flux (Winter period)	Unventilated Air cavity # 1	0.4110	$\text{m}^2 \cdot \text{K/W}$
	Metallized reinforced perforated film		
	APRO	3.52	$\text{m}^2 \cdot \text{K/W}$
	Metallized membrane		
	Ventilated Air cavity # 2 (the thermal resistance of external surface R_{se})	0.1863	$\text{m}^2 \cdot \text{K/W}$
	R Total	4.12	$\text{m}^2 \cdot \text{K/W}$

Table 5: Wall construction calculation results for slope $\alpha = 90^\circ$ (EN ISO 6946)

ATI PRO Excellence Permeable installed on wall			
Angle: $\alpha = 90^\circ$	Layer	R value	Unit
Ascendant Heat Flux (Winter period)	Unventilated Air cavity # 1	0.4801	$\text{m}^2 \cdot \text{K/W}$
	Metallized reinforced perforated film		
	APRO	3.52	$\text{m}^2 \cdot \text{K/W}$
	Metallized membrane		
	Ventilated Air cavity # 2 (the thermal resistance of external surface R_{se})	0.2726	$\text{m}^2 \cdot \text{K/W}$
	R Total	4.27	$\text{m}^2 \cdot \text{K/W}$

Requirements for calculation validity:

- Calculations of R values are valid for a pitched roof (α is generally from 0° to 90°).
- Calculations of R values are valid when APRO is installed in agreement with the installation guidelines described into the manufacturer brochure.

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