

## **TEST REPORT N° AC99-173** **CONCERNING A ROOF**

The accreditation by the COFRAC Laboratory Section attests to the technical competence of the laboratories only for the tests covered by the accreditation.

Scope of accreditation available on request.

This Test Report certifies only the characteristics of the object submitted for testing and does not prejudge the characteristics of similar products. So it does not constitute a product certification in the sense of Article L 115-27 of the Consumer Code and of the Law of June 3, 1994.

The reproduction of this Test Report is authorised only in its integral form.

It comprises ten pages.

**REQUESTED BY: AIRISOL**  
**Parc d'activités de la Maison Neuve**  
**6, rue Louis Bréguet**  
**44980 SAINTE LUCE SUR LOIRE**

Our/Ref.: BR-1106483  
CS/EC.

**SCOPE**

Determine the airborne sound insulation R of a roof.

**REFERENCE TEXTS**

The measurements are carried out according to the standards NF EN ISO 140-1, NF EN 20140-2 and NF EN ISO 140-3 supplemented by the standard NF EN ISO 717/1 and by the appendix of the standard NF S 31-057 concerning the calculation of the overall indexes in dB(A).

**SAMPLES SUBMITTED TO THE TESTS**

Date of reception to the Acoustic Evaluation Division: 15/11/99 (tiles) & 19/11/99 (AIRFLEX)  
Origin: REDLAND (tiles) & AIRISOL (AIRFLEX)  
Installation: CSTB (roof) & AIRISOL (AIRFLEX)

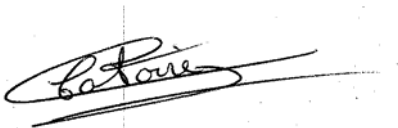
**SUMMARY LIST IF TESTS**

Test N°	Sample
1	Roof with double romane concrete tiles
2	Roof with double romane concrete tiles and AIRFLEX

Made at Marne La Vallée, January 5<sup>th</sup> 2000

Responsible for the tests,

The Head of the Acoustic Department,



Carole SIBEUD



Jacques ROLAND

## AIRBORNE SOUND INSULATION R OF A ROOF

Test	1
Date	19/11/99
Station	DELTA

AD51

**REQUESTER**                      **AIRISOL**

**REFERENCE PRODUCT**    **Roof with double romane concrete tiles**

**MAIN CHARACTERISTICS**

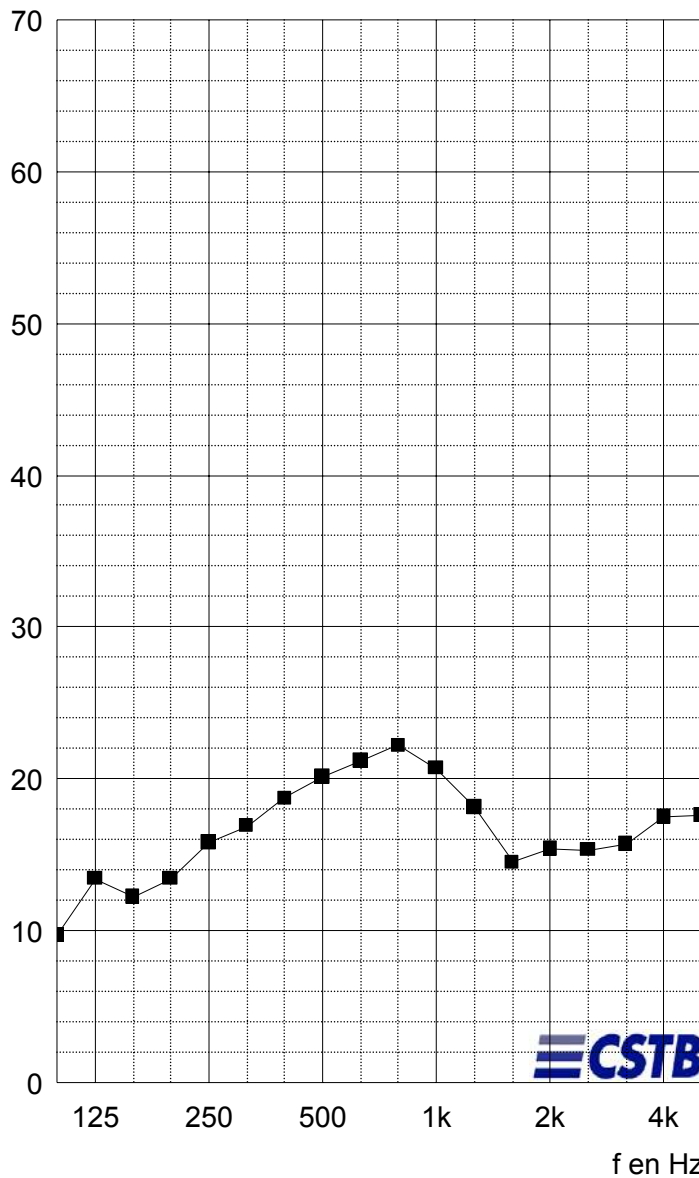
Dimensions in mm: 4210 x 3610

Thickness in mm: ~ 240

Mass per unit of area in kg/m<sup>2</sup>: ~ 43 (without frame)

**RESULTS**

R en dB



f	R
100	9,7
125	13,4
160	12,2
200	13,4
250	15,8
315	16,9
400	18,7
500	20,1
630	21,2
800	22,2
1000	20,7
1250	18,1
1600	14,5
2000	15,4
2500	15,3
3150	15,7
4000	17,5
5000	17,6
Hz	dB

(\*) : valeur corrigée.                      (+) : limite de poste.

$R_w (C;C_{tr}) = 18(-1;-1) \text{ dB}$

$R_{rose} = 17 \text{ dB(A)}$

$R_{route} = 17 \text{ dB(A)}$

**AIRBORNE SOUND INSULATION R  
OF A ROOF****Test 1**  
**Date 19/11/99**  
**Station DELTA****REQUESTER AIRISOL****REFERENCE PRODUCT Roof with double romane concrete tiles****MAIN CHARACTERISTICS**

Dimensions in mm: 4210 x 3610

Thickness in mm: ~ 240

Mass per unit of area in kg/m<sup>2</sup>: ~ 43 (without frame)**DESCRIPTION**

Wood structure: Wooden frame 160 x 32 mm section fixed in suburb of the test concrete frame with threaded rod diameter 16 mm.  
Joists of dimensions 160 x 32 mm, fixed with brace screwed in the wooden frame, perpendicular in the length of the frame, with an entraxe of 600 mm.  
Battens of dimensions 40 x 25 mm (l x h) fixed perpendicularly to joists with an entraxe about 316 mm.

Coverage: Double romane concrete tiles REDLAND, dimensions 420 x 330 mm, mass 4,2 kg per tile, installed with a covering of 80 mm.

waterproofness: Silicon seal on suburb of the tiles and the concrete frame.

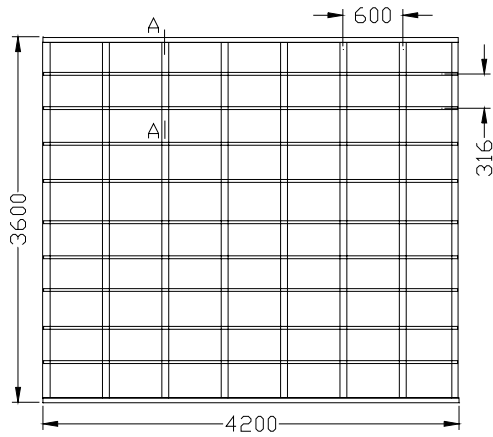
**AIRBORNE SOUND INSULATION R  
 OF A ROOF**

Test 1  
 Date 19/11/99  
 Station DELTA

**REQUESTER AIRISOL**

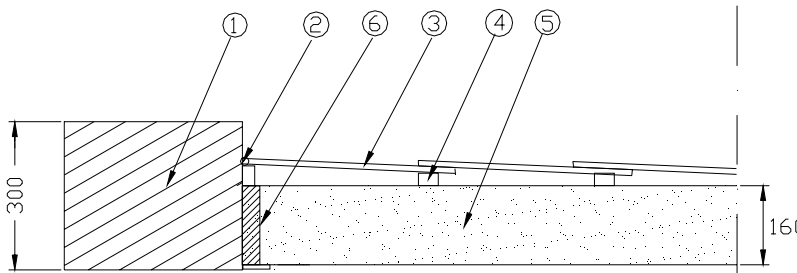
**REFERENCE PRODUCT Roof with double romane concrete tiles**

OVERALL VIEW OF THE STRUCTURE



- 1 Concrete frame
- 2 Silicone seal
- 3 Double romane concrete tile
- 4 Joist section 40x25 (lxh)
- 5 Battens section 32x160 (lxh)
- 6 Wood frame section 32x160 (lxh)

COUPE A-A



Dimensions in mm

## AIRBORNE SOUND INSULATION R OF A ROOF

Test	2
Date	19/11/99
Station	DELTA

AD51

**REQUESTER**                      **AIRISOL**

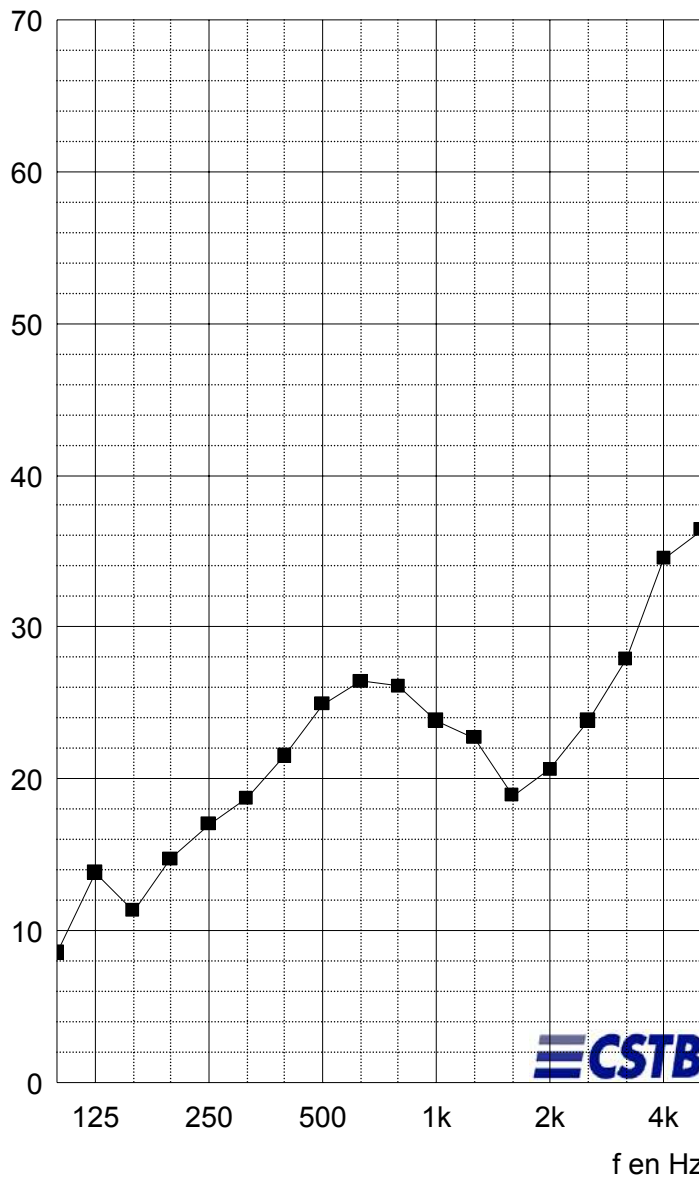
**REFERENCE PRODUCT**    **Roof with double romane concrete tiles and AIRFLEX**

**MAIN CHARACTERISTIC**

Dimensions in mm: 4210 x 3610  
 Thickness in mm: ~ 240  
 Mass per unit of area in kg/m<sup>2</sup>: ~ 44 (without frame)

**RESULTS**

R en dB



f	R
100	8,5
125	13,8
160	11,3
200	14,7
250	17,0
315	18,7
400	21,5
500	24,9
630	26,4
800	26,1
1000	23,8
1250	22,7
1600	18,9
2000	20,6
2500	23,8
3150	27,9
4000	34,5
5000	36,4
Hz	dB

(\*) : valeur corrigée.                      (+) : limite de poste.

$R_w (C; C_{tr}) = 23(-1; -3) \text{ dB}$

$R_{\text{rose}} = 23 \text{ dB(A)}$                        $R_{\text{route}} = 20 \text{ dB(A)}$

**AIRBORNE SOUND INSULATION R  
OF A ROOF****Test 2**  
**Date 19/11/99**  
**Station DELTA****REQUESTER AIRISOL****REFERENCE PRODUCT Roof with double romane concrete tiles and AIRFLEX****MAIN CHARACTERISTIC**

Dimensions in mm: 4210 x 3610

Thickness in mm: ~ 240

Mass per unit of area in kg/m<sup>2</sup>: ~ 44 (without frame)**DESCRIPTION**

- Wood structure: Wooden frame 160 x 32 mm section fixed in suburb of the test concrete frame with threaded rod diameter 16 mm.  
Joists of dimensions 160 x 32 mm, fixed with brace screwed in the wooden frame, perpendicular in the length of the frame, with an entraxe of 600 mm.  
Battens of dimensions 40 x 25 mm (l x h) fixed perpendicularly to joists with an entraxe about 316 mm.
- Coverage: Double romane concrete tiles REDLAND, dimensions 420 x 330 mm, mass 4,2 kg per tile, installed with a covering of 80 mm.
- Waterproofness: Silicon seal on suburb of the tiles and the concrete frame.
- Insulating complex: AIRFLEX, manufactured by AIRISOL, appearing in roller 1200 mm width, of total thickness ~ 10 mm and of surfacique mass ~ 620g / m<sup>2</sup>, constituted on both sides, of a 150 micrometer polyethylene film, in bubbles of air, total thickness ~ 3 mm, hot welded on the outside to a 99% pure aluminium film of 30 micrometers thickness, taking in sandwich a foam of polyethylene foam with closed cells of 25 kg/m<sup>3</sup> thickness 3 mm.  
The unit is solidarized by thermic weld in every extremity and in the center of the strip, being able to so save, according to the application, a blade of air (sight) between the central foam and the polyethylene film with air bubble.

**INSTALLATION**

The AIRFLEX product is fastened in sub-face of the roof. The strips have a covering between them and in suburb on the side walls of the trial room from 200 to 300 mm. The waterproofness is realized by an aluminium adhesive.

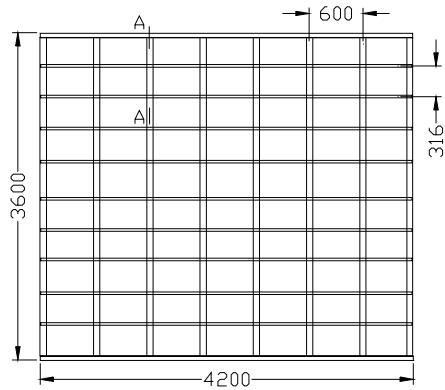
**AIRBORNE SOUND INSULATION R  
 OF A ROOF**

Test 2  
 Date 19/11/99  
 Station DELTA

**REQUESTER AIRISOL**

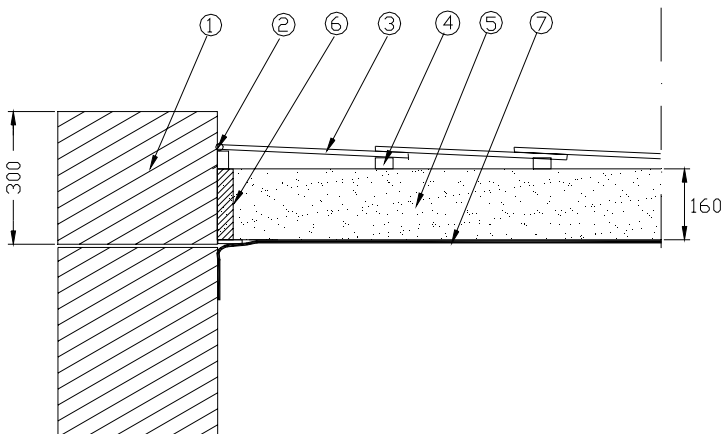
**REFERENCE PRODUCT Roof with double romane concrete tiles and AIRFLEX**

OVERALL VIEW OF THE STRUCTURE



- 1 Concrete frame
- 2 Silicone seal
- 3 Double romane concrete tile
- 4 Joist section 40x25 (lxh)
- 5 Battens section 32x160 (lxh)
- 6 Wood frame section 32x160 (lxh)
- 7 AIRFLEX

COUPE A-A



Dimensions in mm





## APPENDIX 1 – APPARATUS

## STATION DELTA

Emission room: DELTA 3

DÉSIGNATION	BRAND	TYPE	CSTB No
Microphon	Bruël & Kjær	4166	ACOU 92 5
Preamplifier	Bruël & Kjær	2669	ACOU 97 23
Rotating arm	Bruël & Kjær	3923	ACOU 97 21
Amplifier	LAB GRUPPEN	LAB1000	ACOU 97 47
Speaker	CSTB-PHL AUDIO	Cube	ACOU 97 35
Speaker	CSTB-PHL AUDIO	Cube	ACOU 97 36

Reception room: DELTA 2

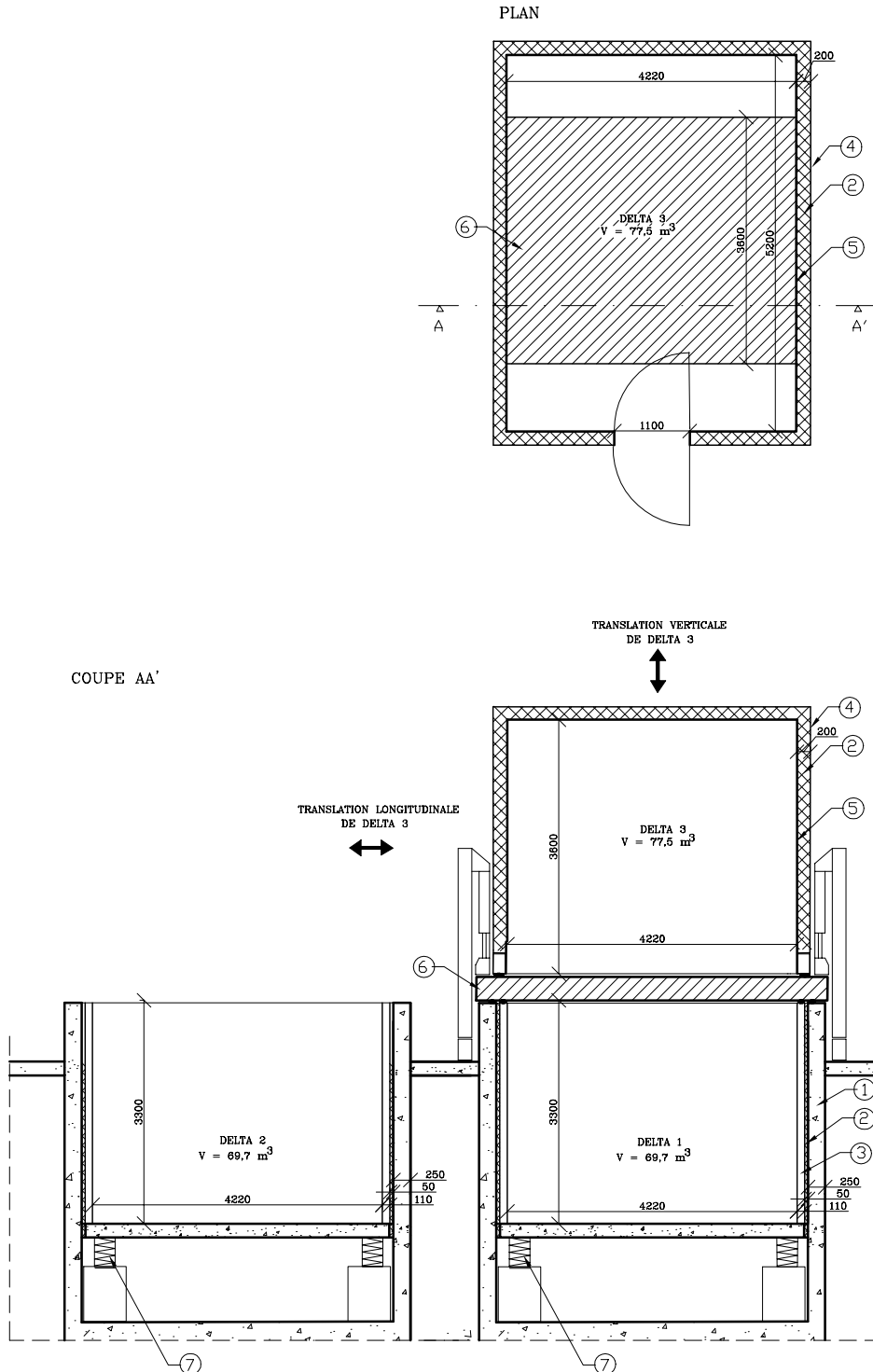
DÉSIGNATION	BRAND	TYPE	CSTB No
Microphon	Bruël & Kjær	4166	ACOU 93 8
Preamplifier	Bruël & Kjær	2669	ACOU 97 26
Rotating arm	Bruël & Kjær	3923	ACOU 90 14
Amplifier	CARVER	PM600	ACOU 91 11
Speaker	CSTB-ELECTRO VOICE	Pyramid	ACOU 97 53

Control room

DÉSIGNATION	BRAND	TYPE	CSTB No
Real Time Analyser	Bruël & Kjær	2144	ACOU 97 18
Micro computer	HEWLETT-PACKARD	VL4	
Calibrator	Bruël & Kjær	4231	ACOU 95 5

**APPENDIX 2 – DRAWING OF THE TEST STATION**

**STATION DELTA**



dimensions en mm

7	Boîte à ressort	échelle:	1/100
6	Surface de l'ouverture S=15 m²		
5	Tôle acier 6mm	<b>POSTE DELTA</b>	
4	Tôle acier 2mm		
3	Bloc de béton plein e=100 mm		
2	Laine minérale	<b>ACOUSTIQUE</b>	
1	Béton e=200 mm		
REP	DESIGNATION		