Analysis

Joint sound insulation of filler materials

Testing Report 167 43780/Z2

[logo: ift Rosenheim]

Basis
ift regulation SC-01 “determination of joint sound insulation degree” of 2002

Diagram

Applicant	**Hanno-Werk GmbH & Co. KG** Julius-Fengler-Str. 53 30880 Laatzen
Product	Pre-compressed sealing strip (multi-function strip)
Description	Hannoband 3E 64/6-15
Degree of Compression	32%
Width of Sealing Strip	64 mm
	-/-

Assessed degree of joint sound insulation $R_{ST,W}$
Spectrum adjustment values C and C_{tr}

$R_{ST,W}$ (C; C_{tr}) = 58 (-1;-2) dB

Reported for a joint width of 10 mm

ift Rosenheim
21 July 2010
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Dr. Joachim Hessinger, Dipl.-Phys.
Testing Center Director
ift Sound Insulation Center

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Bernd Saß, Dipl.-Ing. (FH)
Rep., Testing Center Director
ift Sound Insulation Center

Usage Instructions
This procedure is intended for comparison of filler products (e.g. joints and gaskets, filler materials for sealing joints). The measured values can be consulted for estimating transmission degree τ_e per EN 12354-3, attachment B. The calculated joint sound insulation does not replace a verification of the entire structure for determination of total sound insulation.

Validity
The referenced data and results are valid only for the test sample described.
The test for sound insulation does not imply any other performance- or quality-determining features of the current construction.

Publication Method
The **ift** data sheet “Usage Conditions and Instructions for **ift** Testing Documentation” is valid. The cover sheet can be used as a summary.

Contents
The testing report includes a total of 7 pages

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for suitability and quality control testing, DIN 4109

1 Objective

1.1 Test Sample Description

Product	Pre-compressed sealing strip (multi-function strip) The strip is composed of layers of black sealing strip.
Generation of test sample	17 June 2010
Product Description	Hannoband 3E 64/6-15
Total width of sealing strip	64 mm
Range of Application per Manufacturer Specifications	joint widths of 6-15 mm
Measurements	
Joint length l	1200 mm
Joint depth t	100 mm
Joint width b	10 mm
Joint covering	no covering
Conditioning time	33 days
Degree of compression	32% (based on 31 mm final thickness in freely expanded condition)
Length-specific mass of sealing strip	196 g/m

The description is based on analysis of the test sample in **ift**. Product descriptions and product numbers, as well as material specifications are provided by the applicant. (Additional manufacturer specifications are marked with *.)

1.2 Installation in the Testing Facility

Measurement of the degree of joint sound insulation R_{ST} took place in a mobile joint measurement arrangement (see figures 1 and 2). This mobile measurement apparatus is comprised of highly sound-insulating ground support element made of metal cladding and Bondal sheets with plug-in cassettes; the plug-in cassette claddings were filled with sand. In the plug-in cassettes, many different joints with differing gap widths can be expressed (figure 1).

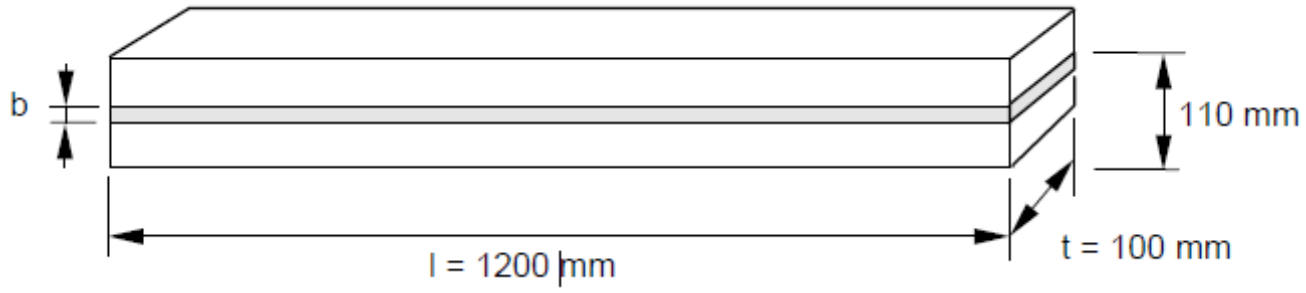


Figure 1 plug-in cassettes

These plug-in cassettes were prepared by the **ift** Noise Insulation Center in conjunction with the applicant 33 days before the testing date, using the filler material to be tested. The cassettes were installed in the highly noise insulating frame (figure 2) which was mounted in the testing aperture in the partition wall of the window test stand per EN ISO 140-1: 2005-03. The connection joints for the testing aperture were filled with foam and sealed on both sides with plastic sealants.

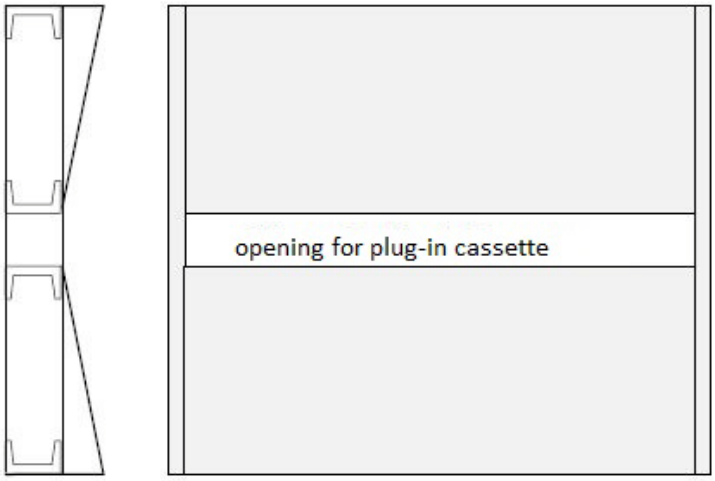


Figure 2 Joint test stand arrangement (highly noise-insulating element)

Figure 3 Photograph of the installed element (taken by the ift Noise Insulation Center)

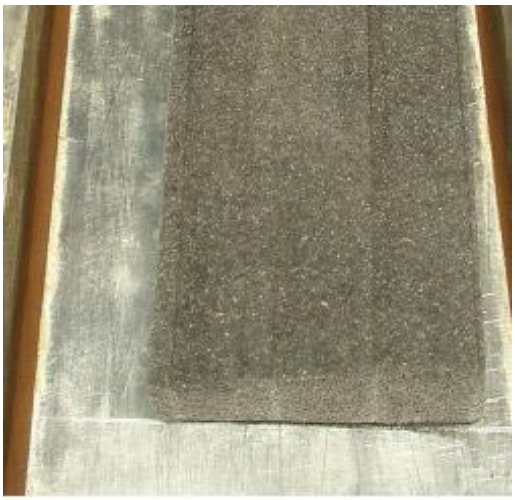


Figure 4 Photograph of the uninstalled band (taken by the ift Noise Insulation Center after the test)

2 Testing

2.1 Sample Collection

Test Specimen Selection	Samples were selected by the applicant. The plug-in cassettes were filled with the filler materials to be tested per the manufacturer's instructions for use.
Number	1
Manufacturer	Hanno-Werk GmbH & Co. KG
Manufacturing Works	30880 Laatzen
Manufacture Date / Time of Sample Collection	14 July 2010
Responsible Processor	Mr. Kethorn
Delivery to **ift**	17 June 2010 by the applicant
ift Registration Number	28363/2

2.2 Procedure

Basis	**ift** guideline SC-01/2:2002-09
Border conditions	"Determining Degree of Joint Sound Insulation"
Deviation	in accordance with the guideline specifications.
Testing noise	pink noise (flicker noise)
Measuring filter	1/3 octave band filter
Measurement limit	
Background noise level	The background noise level in the reception room was determined via measurement and the reception room noise level L_2 was mathematically corrected in accordance with EN ISO 140-3:1995 + A1:2004 section 6.5.
Maximum noise insulation	Maximum noise insulation of the testing arrangement is within the scope of the measured results. The measured results display the minimum values. No mathematical correction of maximum noise insulation was performed.
Measurement of reverberation time	Mathematical averaging: 2 measurements from 2 loudspeakers and 3 microphone positions, each (a total of 12 measurements).
Measurement equation	$A = 0.16 * \frac{V}{T} m^2$
Measurement of sound level difference	At least 2 loudspeaker positions and microphones moved within a circular orbit

Measurement equation

$$R_{ST} = L_1 - L_2 + 10 \log \frac{S_N * l}{A * l_N} * dB$$

LEGEND

R_{ST}	degree of sound insulation in dB
L_1	noise level of source room in dB
L_2	noise level of reception room in dB
l	joint length in m
S_N	reference area (1 m^2)
l_N	reference length (1m)
A	equivalent insulation surface in m^2
V	volume of reception room in m^3
T	reverberation time in s

The degree of joint noise insulation is comparable to a degree of noise insulation of a structural component which possess a 1 m long joint for each m^2 of surface, in which noise transmission only occurs via the joint.

If the joint is attached to a structural component (e.g. a window with surface S and noise insulation degree R) and it is assumed that the structural component surface S >> than the aperture size of the joint (b * l, b = joint width), the corresponding joint length l can be used to calculate the resultant noise insulation degree R_{res} with the following equation:

$$R_{res} = -10 \log \left(10^{-\frac{R}{10}} + \frac{l}{S} \cdot 10^{-\frac{R_{ST}}{10}} \right) \text{ dB}$$

2.3 Testing Materials

Device	Type	Manufacturer
integrated measurement system	Type Nortronic 121	Fa. Norsonic-Tippkemper
microphone preamplifier	Type 1201	Fa. Norsonic-Tippkemper
microphone capsule	Type 1220	Fa. Norsonic-Tippkemper
calibrator	Type 1251	Fa. Norsonic-Tippkemper
dodecahedron loudspeaker	constructed in-house	-
amplifier	Type E120	Fa. FG Elektronik
rotating microphone stand	constructed in-house / Type 230-N-360	Fa. Norsonic-Tippkemper

The ift Noise Insulation Center has participated in comparative measurements at the Federal Physical Technical Institute (PTB) in Braunschweig at every 3 years, most recently in April 2010. The noise level measurer, serial no. 31423, was calibrated on 19 January 2010 by the Calibration Office of Dortmund. The calibration is valid until 31 December 2012.

2.4 Administration of Test

Date	20 July 2010
Testing engineer	Bernd Saß

3 Individual Results

The values of the measured degree of noise insulation R_{ST} of the filler material examined are noted in a chart on the attached data sheet (attachment) with respect to frequency. This allows the calculation of calculated degree of noise insulation $R_{ST,W}$ and spectrum adjustment values C and C_{tr} with respect to a joint length l = 1.20 m, modelled after EN ISO 717 – 1 for frequency ranges of 100 Hz to 3150 Hz.

The curve diagram depicts both the maximum degree of noise insulation for the testing arrangement (with regard to l = 1.20 m) and the calculated maximum degree of noise insulation $R_{ST,W\,MAX}(C;C_{tr})$ = 62 (-1;-4) dB.

The calculated degrees of noise insulation were partly within the scope of maximum noise insulation – in these cases, these values are minimum values. No mathematical correction of maximum noise insulation was performed.

The calculated degrees of noise insulation for various joint arrangements are depicted in Table 1.

Table 1 Measured results, joint depth *t* = 100 mm

Measured degree of noise insulation $R_{ST,W}(C;C_{tr})$ in dB	Type of measures taken, comments
62 (-1;-4)	Maximum noise insulation
58 (-1;-2)	Joint width 10 mm, filled with Hannoband 3E 64/6-15

4 Usage Instructions

General Instructions:

This procedure is intended to compare construction materials for insulation (e.g. seals, filler materials for sealing joints). The measured results can be used to estimate degree of transmission □e per EN 12354-3, Attachment B. Calculated joint sound insulation does not replace a verification of the entire structure for determination of total sound insulation.

For practical purposes, meaning the combination of noise insulation of a window with noise insulation of a solid window niche, the following should be taken into account:

a) For physical reasons, the degree of noise insulations should be corrected by approximately -3 dB near corners and edges;
b) It should be adapted to the actual thickness of the window frame profile (joint depth t), and leads to a correction of -1 dB to -2 dB.

Consequently, the measured degree of noise insulation, in practice, must either

a) be corrected by -4 dB, or
b) be increased by adding additional elastic sealant with rope caulk.

Degree of Noise Insulation, per **ift** guidelines SC-01

[logo: ift Rosenheim]

Determination of Degree of Noise Insulation

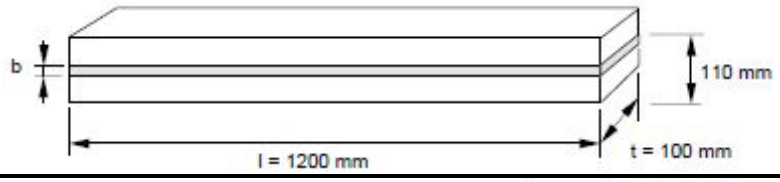
Applicant: Hanno-Werk GmbH & Co. KG, 30880 Laatzen
Product Description: Hannoband 3E 64/6-15

Assembly of the Testing Sample

Pre-compressed sealing strip (multi-function band)
Joint geometry

length l	1200 mm
depth t	100 mm
width b	10 mm
comp. degree	32%

Diagram of Testing Arrangement



Testing Date	20 July 2010
Test Length l	1.2 m

Testing partition wall: concrete double wall, insert frame

Testing noise: pink noise

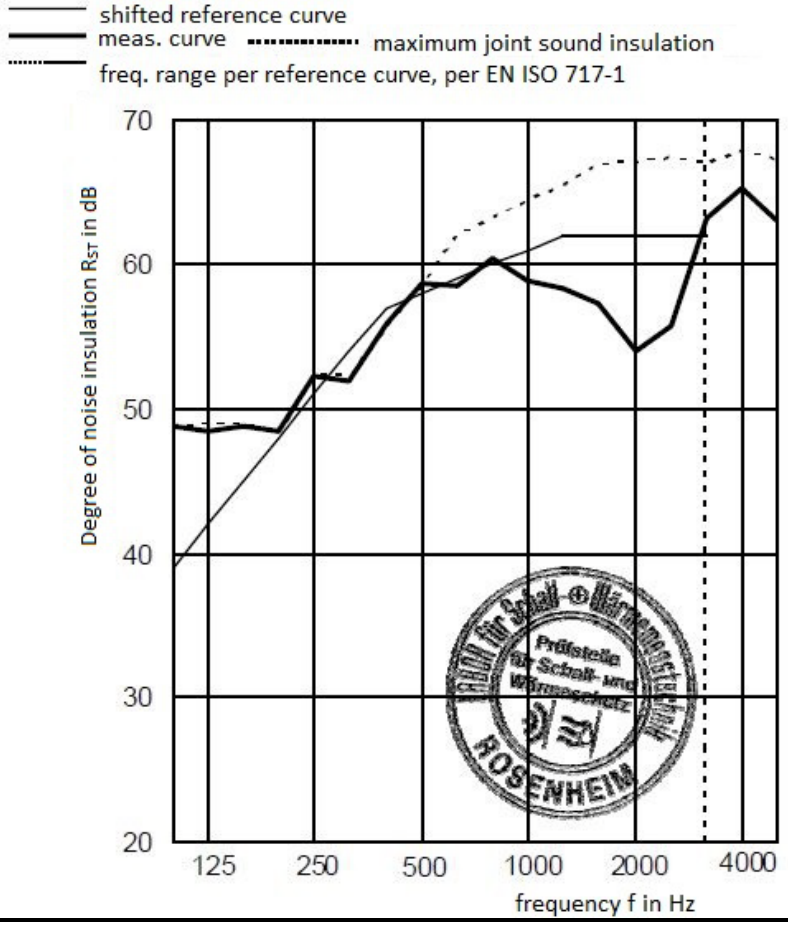
Testing range volume: V_S = 104 m^3, V_E = 67.5 m^3

Maximum degree of noise insulation
$R_{ST,W,MAX}$ = 63 dB (based on testing length)

Installation conditions
Installation of cassettes in a highly noise-insulating element.

Temp. of Testing Room: 23° C / 60% RF

f in Hz	R_{ST} in dB
100	48.8
125	48.5
160	48.9
200	48.5
250	52.3
315	51.9
400	55.9
500	58.7
630	58.6
800	60.4
1000	58.8
1250	58.4
1600	57.3
2000	54.0
2500	55.8
3150	63.2
4000	65.3
5000	63.1



Calculation per EN ISO 717-1 (in frequency ranges):
$R_{ST,W}$ (C;C_{tr}) = 58 (-1;-2) dB $C_{100\text{-}5000}$ = -1 dB; $C_{tr,\ 100\text{-}5000}$ = -2 dB

Data Sheet 1
ift Rosenheim
Noise Insulation Center
21 July 2010

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