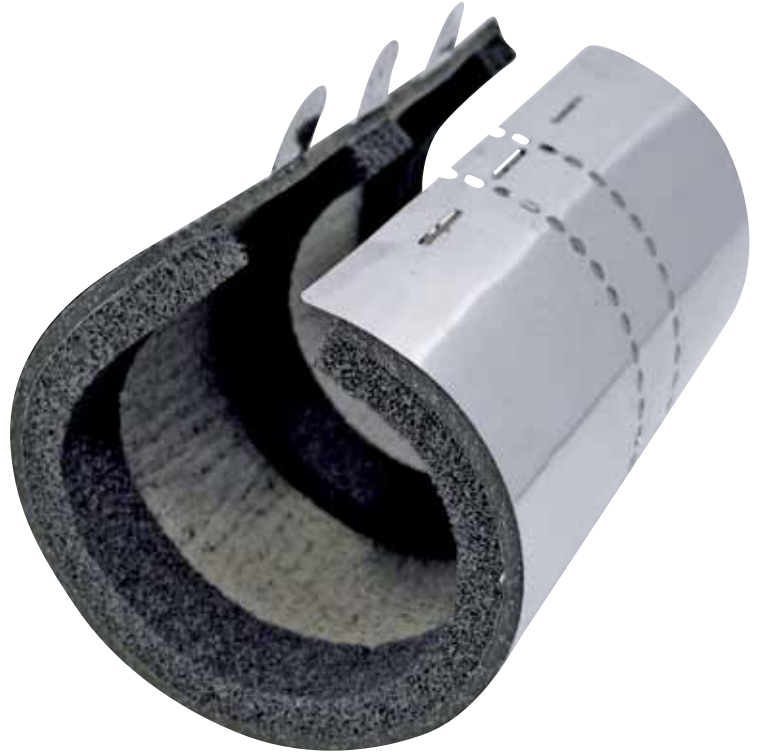


Technical Information BIS Pacifyre® MK II Fire Sleeve



Technical comment on the Noise Control Performance with Mortar & Foam S9712

- Sealing of combustible pipes -

Walraven GmbH

Postfach 125128
95425 Bayreuth (DE)
Tel. +49 (0)921 75 60 0
Fax +49 (0)921 75 60 111
info@walraven.de

Walraven Group

Mijdrecht (NL) · Tienen (BE) · Bayreuth (DE)
Grenoble (FR) · Banbury (GB) · Madrid (ES)
Mladá Boleslav (CZ) · Kraków (PL) · Kyiv (UA)
Moscow (RU) · Wixom – Detroit (US)





Fraunhofer-Institut für Bauphysik Postfach 80 04 69 D-70504 Stuttgart

BIS Walraven
Herr Dipl.-Ing. (FH) Kai Schnippe VDI
Karl-von-Linde-Strasse 22

95447 Bayreuth

Institutsleitung
Univ.-Prof. Dr.-Ing. Gerd Hauser
Univ.-Prof. Dr.-Ing. Klaus Sedlbauer

Nobelstraße 12
D-70569 Stuttgart

Telefon +49 (0) 711/970-00
Telefax +49 (0) 711/970-3395
info@ibp.fraunhofer.de
www.ibp.fraunhofer.de

Dipl.-Ing. Pascal Teller
Durchwahl +49 (0) 711/970-3410
Fax +49 (0) 711/970-3406
teller@ibp.fraunhofer.de

Ihr Zeichen

Ihre Nachricht vom

Unser Zeichen
PT

Stuttgart,
June 17, 2007

S 9712 – Technical Comment on the Noise Control Performance "Pacifyre® MKII – Fire Protection Sleeve"

Dear Mr. Schnippe,

on April 18, 2006 acoustic measurements of the fire protection sleeve "Pacifyre® MKII – fire protection sleeve" with the approval number Z-19.17-1737 of J. van Walraven B.V. company were carried out at the premises of BIS-Walraven GmbH. Testing was aimed at investigating the acoustic properties of the fire protection sleeve. For this process, several cast iron pipes (SML, DN 100) or plastic pipes (PE-HD, DN100) of 1 m length were installed in the gaps of 15 cm thick concrete slab (2,45 m x 3,60 m) to simulate a ceiling breakthrough (Fig. 1 and Fig. 2). The test specimens 1 and 2 were moulded soundproof without pipe covering. The test specimens 3 and 7 were covered by a "Pacifyre® MKII – fire protection sleeve" before mortar grouting with "Henkel Tangit FP300 – fire protection mortar". The installation of these test specimens was effected according to the assembly instructions of the manufacturer by BIS-Walraven GmbH in each case.

After the drying of the fire protection mortar, the concrete slab was excited by means of a normalized impact sound tapping machine. The impact sound transferred by the concrete slab (may be by the fire protection sleeve) to the pipes is measured by means of accelerometers. In the process, two transducer positions and two excitation positions respectively were selected and the measured sound level was energetically averaged. (The distance between transducer and excitation position was equal for all pipes.)

The frequency-dependent insertion loss D_e results from the difference of the impact sound levels against the soundproof moulded pipes (test specimens 1 and 2) and the respective pipes with the "Pacifyre® MKII – fire protection sleeve" (and fire protection mortar). Thus, insertion loss indicates

Bauaufsichtlich anerkannte Stelle für Prüfung, Überwachung und Zertifizierung

Prüflaboratorien
nach DIN EN/ISO/IEC 17025:2000
durch das DAP akkreditiert



DAP-PL-3743.26 Bauakustik und Schallimmissionsschutz
DAP-PL-3743.30 Feuchte/Mörtel/Strahlung/Emissionsschutz
DAP-PL-3743.25 Feuerstätten/Abgasanlagen
DAP-PL-3743.27 Wärme-Kennwerte

Vorstand der Fraunhofer-Gesellschaft
Univ.-Prof. Dr.-Ing. habil. Prof. e.h. Dr. h.c.
Hans-Jörg Bullinger, Präsident
Dr. rer. nat. Ulrich Buller
Dr. rer. pol. Alfred Gossner
Dr. jur. Dirk-Meints Polter

Fraunhofer-Gesellschaft zur Förderung
der angewandten Forschung e.V., München
Bankverbindung: Deutsche Bank, München
Konto 7521933 BLZ 700 700 10
IBAN: DE86 7007 0010 0752 1933 00,
BIC (SWIFT-Code): DEUTDEMM

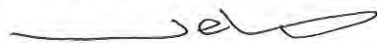
the reduction of impact sound transmission in case of applying the "Pacifyre® MKII – fire protection sleeve" in comparison to the soundproof installation of the pipe (unfavourable installation variation) and may be considered as a measurement for the acoustic suitability of a product. High values mean an intense reduction of impact sound transmission. Insertion losses of the investigated specimens are presented in Fig. 3 and Fig. 4. All investigated test set-ups show a considerable reduction of impact sound transmission in comparison to a rigidly moulded pipe.

To compare different products, a single-number indication is desirable for the frequency-dependent insertion loss. As different factors such as the frequency spectrum of the excitation or the surrounding building influence this single-number indication, the analysed insertion losses were weighted by a waste water spectrum (Fig. 5). The spectrum of a waste water system made of SML pipes (values for plastic pipes were not available) and measured in a room behind the installation wall in the test facility of the Fraunhofer Institute for Building Physics was selected for testing. As concerns this test set-up, sound transmission was primarily effected via the concrete-covered breakthrough in the ceiling (waste water system without decoupling of noise in the area of the breakthrough). It is possible to assess the spectrum, which would result from the installation of the "Pacifyre® MKII – fire protection sleeve" by subtraction of the insertion loss from the spectrum of the concrete-covered waste water system. The difference of the humming level of both spectra serves as single-number indication of the insertion loss as well as for the acoustic characterisation of the investigated products in connection with waste water systems (Table 1).

Note: The test set-up used is a simplified reproduction of a ceiling breakthrough for waste water systems and a simplified measurement method. The stated measurement results must be considered as reference values and do not replace any measurement in the test facility or with the executed object. This applies for the analysed single-number indications in particular, as they are based on a simplified model. It may, however, be assumed that an effective sound decoupling is possible in practice by applying the „Pacifyre® MKII – fire protection sleeve“. Moreover it must be noticed that in this case only sound transmission in the range of the ceiling breakthrough / fire protection sleeve was taken into consideration. Other fixing elements (e.g. pipe clamps) may cause an increase in sound transmission via the waste water system in practice.

Yours sincerely,
Fraunhofer Institute for Building Physics

by order of

A handwritten signature in black ink, appearing to read 'P. Teller'.

Dipl.-Ing. Pascal Teller

Table 1 Single-number indications of the insertion loss to be expected for the "Pacifyre® MKII – fire protection sleeve" with "Henkel Tangit FP300 – fire protection mortar" referring to the application in waste water systems.

tested object	insertion loss [dB]
cast iron pipe with "Pacifyre® MKII – fire protection sleeve" and "Henkel Tangit FP300 – fire protection mortar"	37
plastic pipe with "Pacifyre® MKII – fire protection sleeve" and "Henkel Tangit FP300 – fire protection mortar"	21



Fig. 1

Above: soundproof SML pipe moulded by means of mortar (test specimen 1).
Below: SML pipe with "Pacifyre® MK II – fire protection sleeve" installed and remaining opening sealed by „Henkel Tangit FP300 – fire protection mortar“ (test specimen 3).



Fig. 2

Above: soundproof PE-HD pipe moulded by means of mortar (test specimen 2).
Below: PE-HD pipe with "Pacifyre® MKII – fire protection sleeve" installed and remaining opening sealed by „Henkel Tangit FP300 – fire protection mortar“ (test specimen 7).

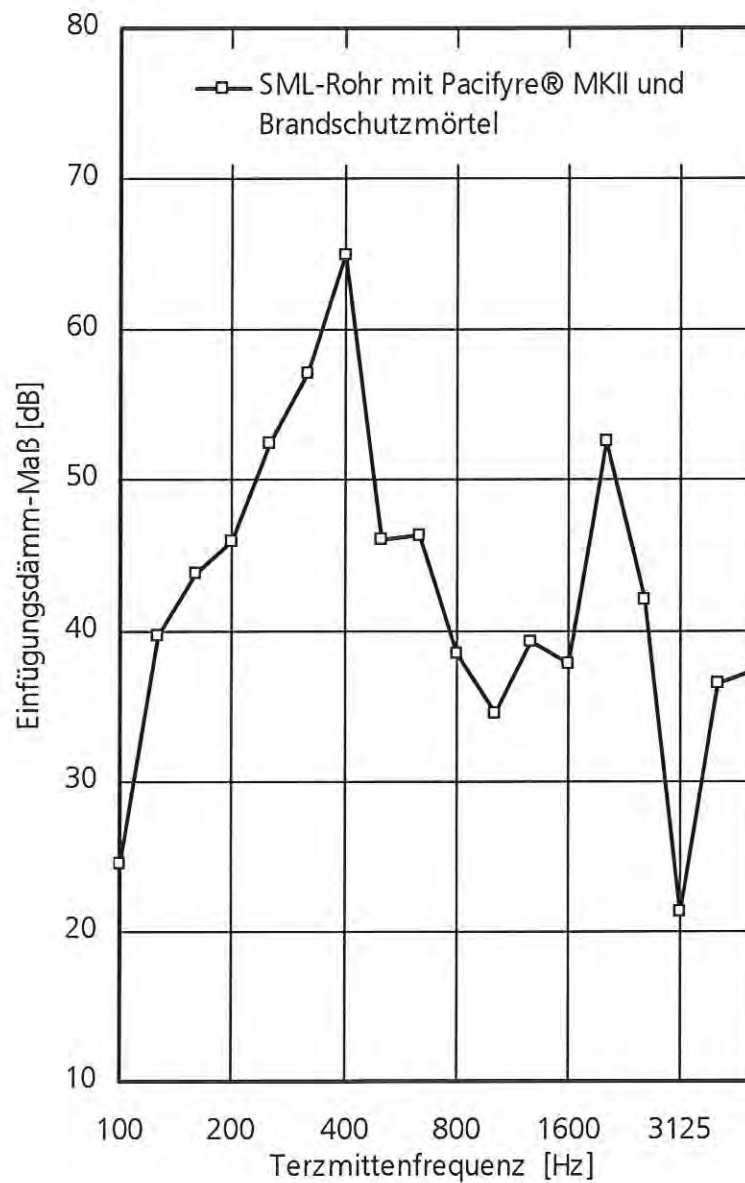


Fig. 3

Frequency-dependent insertion loss of the fire protection sleeve "Pacifyre® MKII" with approval number Z-19.17-1737 of J. van Walraven B.V. in connection with pipes of SML. The specimens were installed by means of "Henkel Tangit FP300 – fire protection mortar". A pipe without fire protection sleeve rigidly moulded by means of mortar served as reference.

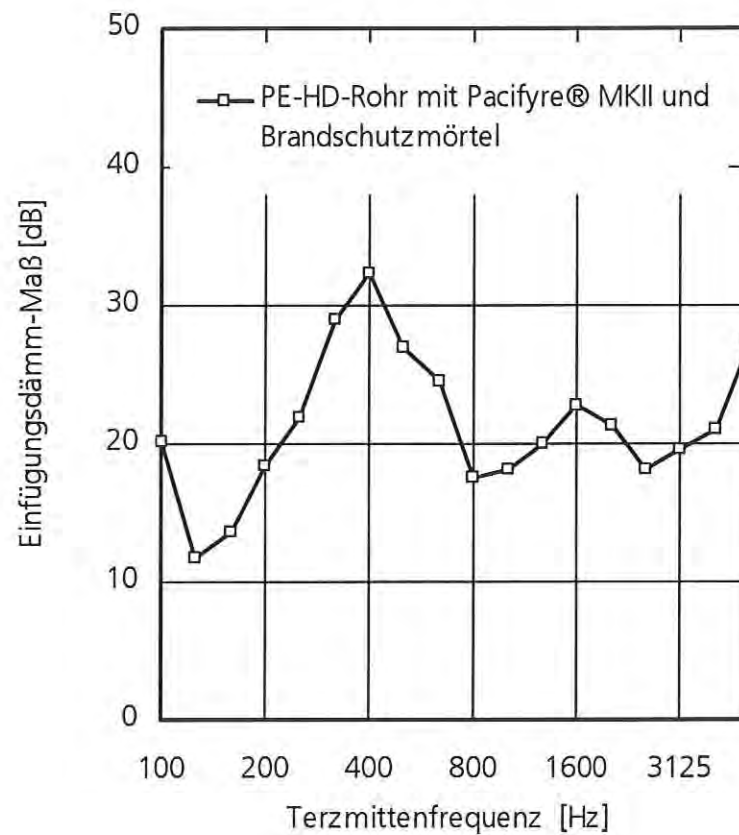


Fig. 4

Frequency-dependent insertion loss of the fire protection sleeve "Pacifyre® MKII" with approval number Z-19.17-1737 of J. van Walraven B.V. in connection with pipes of PE-HD. The specimens were installed by means of "Henkel Tangit FP300 – fire protection mortar". A pipe without fire protection sleeve rigidly moulded by means of mortar served as reference.

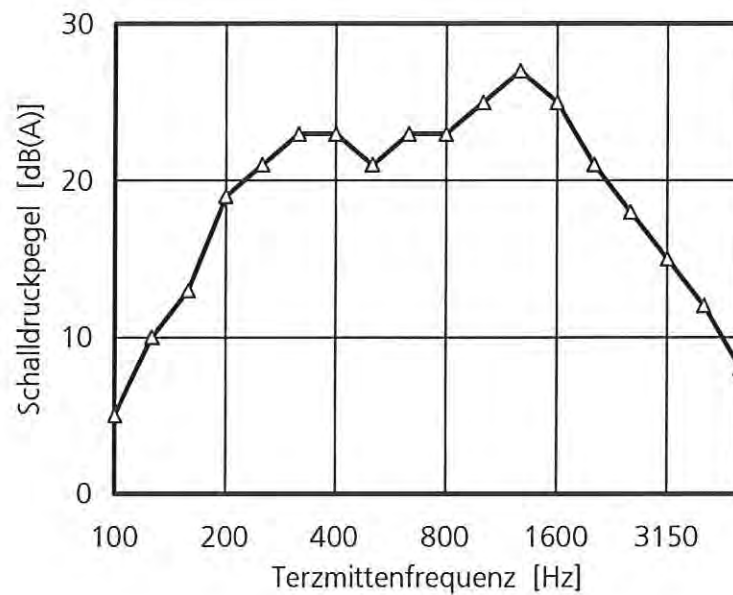


Fig. 5

Spectrum of a waste water system made of SML pipes measured behind the installation wall in the installation test facility of the Fraunhofer Institute for Building Physics at a volume flow of 2 l/s. Sound transmission was effected primarily via the concrete-covered ceiling breakthrough with this test set-up.

Fraunhofer-Institut für Bauphysik Postfach 80 04 69 D-70504 Stuttgart

BIS Walraven
Herr Dipl.-Ing. (FH) Kai Schnippe VDI
Karl-von-Linde-Strasse 22

95447 Bayreuth

Institutsleitung
Univ.-Prof. Dr.-Ing. Gerd Hauser
Univ.-Prof. Dr.-Ing. Klaus Sedlbauer

Nobelstraße 12
D-70569 Stuttgart

Telefon +49 (0) 711/970-00
Telefax +49 (0) 711/970-3395
info@ibp.fraunhofer.de
www.ibp.fraunhofer.de

Dipl.-Ing. Pascal Teller
Durchwahl +49 (0) 711/970-3410
Fax +49 (0) 711/970-3406
teller@ibp.fraunhofer.de

Ihr Zeichen

Ihre Nachricht vom

Unser Zeichen
PT

Stuttgart,
June 17, 2007

S 9712 – Technical Comment on the Noise Control Performance "Pacifyre® MKII – Fire Protection Sleeve"

Dear Mr. Schnippe,

on April 18, 2006 acoustic measurements of the fire protection sleeve "Pacifyre® MKII – fire protection sleeve" with the approval number Z-19.17-1737 of J. van Walraven B.V. company were carried out at the premises of BIS-Walraven GmbH. Testing was aimed at investigating the acoustic properties of the fire protection sleeve. For this process, several cast iron pipes (SML, DN 100) or plastic pipes (PE-HD, DN100) of 1 m length were installed in the gaps of 15 cm thick concrete slab (2,45 m x 3,60 m) to simulate a ceiling breakthrough (Fig. 1 and Fig. 2). The test specimens 1 and 2 were moulded soundproof without pipe covering. The test specimens 4 and 8 were covered by a "Pacifyre® MKII – fire protection sleeve" before foaming the remaining opening with "Henkel Tangit FP550 – fire protection foam". The installation of these test specimens was effected according to the assembly instructions of the manufacturer by BIS-Walraven GmbH in each case.

After the drying of the fire protection foam, the concrete slab was excited by means of a normalized impact sound tapping machine. The impact sound transferred by the concrete slab (may be by the fire protection sleeve) to the pipes is measured by means of accelerometers. In the process, two transducer positions and two excitation positions respectively were selected and the measured sound level was energetically averaged. (The distance between transducer and excitation position was equal for all pipes.)

The frequency-dependent insertion loss D_e results from the difference of the impact sound levels against the soundproof moulded pipes (test specimens 1 and 2) and the respective pipes with the

Bauaufsichtlich anerkannte Stelle für Prüfung, Überwachung und Zertifizierung

Prüflaboratorien
nach DIN EN/ISO/IEC 17025:2000
durch das DAP akkreditiert



DAP-PL-3743.26 Bauakustik und Schallimmissionsschutz
DAP-PL-3743.30 Feuchte/Mörtel/Strahlung/Emissionsschutz
DAP-PL-3743.25 Feuerstätten/Abgasanlagen
DAP-PL-3743.27 Wärme-Kennwerte

Vorstand der Fraunhofer-Gesellschaft
Univ.-Prof. Dr.-Ing. habil. Prof. e.h. Dr. h.c.
Hans-Jörg Bullinger, Präsident
Dr. rer. nat. Ulrich Buller
Dr. rer. pol. Alfred Gossner
Dr. jur. Dirk-Meints Polter

Fraunhofer-Gesellschaft zur Förderung
der angewandten Forschung e.V., München
Bankverbindung: Deutsche Bank, München
Konto 7521933 BLZ 700 700 10
IBAN: DE86 7007 0010 0752 1933 00,
BIC (SWIFT-Code): DEUTDEMM

"Pacifyre® MKII – fire protection sleeve" (and fire protection foam). Thus, insertion loss indicates the reduction of impact sound transmission in case of applying the "Pacifyre® MKII – fire protection sleeve" in comparison to the soundproof installation of the pipe (most unfavourable installation variation) and may be considered as a measurement for the acoustic suitability of a product. High values mean an intense reduction of impact sound transmission. Insertions losses of the investigated specimens are presented in Fig. 3 and Fig. 4. All investigated test set-ups show a considerable reduction of impact sound transmission in comparison to a rigidly moulded pipe.

To compare different products, a single-number indication is desirable for the frequency-dependent insertion loss. As different factors such as the frequency spectrum of the excitation or the surrounding building influence this single-number indication, the analysed insertion losses were weighted by a waste water spectrum (Fig. 5). The spectrum of a waste water system made of SML pipes (values for plastic pipes were not available) and measured in a room behind the installation wall in the test facility of the Fraunhofer Institute for Building Physics was selected for testing. As concerns this test set-up, sound transmission was primarily effected via the concrete-covered breakthrough in the ceiling (waste water system without decoupling of noise in the area of the breakthrough). It is possible to assess the spectrum, which would result from the installation of the "Pacifyre® MKII – fire protection sleeve" by subtraction of the insertion loss from the spectrum of the concrete-covered waste water system. The difference of the humming level of both spectra serves as single-number indication of the insertion loss as well as for the acoustic characterisation of the investigated products in connection with waste water systems (Tabelle 1).

Note: The test set-up used is a simplified reproduction of a ceiling breakthrough for waste water systems and a simplified measurement method. The stated measurement results must be considered as reference values and do not replace any measurement in the test facility or with the executed object. This applies for the analysed single-number indications in particular, as they are based on a simplified model. It may, however, be assumed that an effective sound decoupling is possible in practice by applying the „Pacifyre® MKII – fire protection sleeve“. Moreover it must be noticed that in this case only sound transmission in the range of the ceiling breakthrough / fire protection sleeve was taken into consideration. Other fixing elements (e.g. pipe clamps) may cause an increase in sound transmission via the waste water system in practice.

Yours sincerely,
Fraunhofer Institute for Building Physics

by order of

A handwritten signature in black ink, appearing to read 'P. Teller'.

Dipl.-Ing. Pascal Teller

Tabelle 1 Single-number indications of the insertion loss to be expected for the "Pacifyre® MKII – fire protection sleeve" with "Henkel Tangit FP550 – fire protection foam" referring to the application in waste water systems.

tested object	insertion loss [dB]
cast iron pipe with "Pacifyre® MKII – fire protection sleeve" and "Henkel Tangit FP550 – fire protection foam"	19
plastic pipe with "Pacifyre® MKII – fire protection sleeve" and "Henkel Tangit FP550 – fire protection foam"	13



Fig. 1 Above: soundproof SML pipe moulded by means of mortar (test specimen 1).
Below: SML pipe with "Pacifyre® MK II – fire protection sleeve" installed and re-
maining opening sealed by „Henkel Tangit FP550 – fire protection foam" (test
specimen 4).



Fig. 2

Above: soundproof PE-HD pipe moulded by means of mortar (test specimen 2).
Below: PE-HD pipe with "Pacifyre® MKII – fire protection sleeve" installed and remaining opening sealed by „Henkel Tangit FP550 – fire protection foam" (test specimen 8).

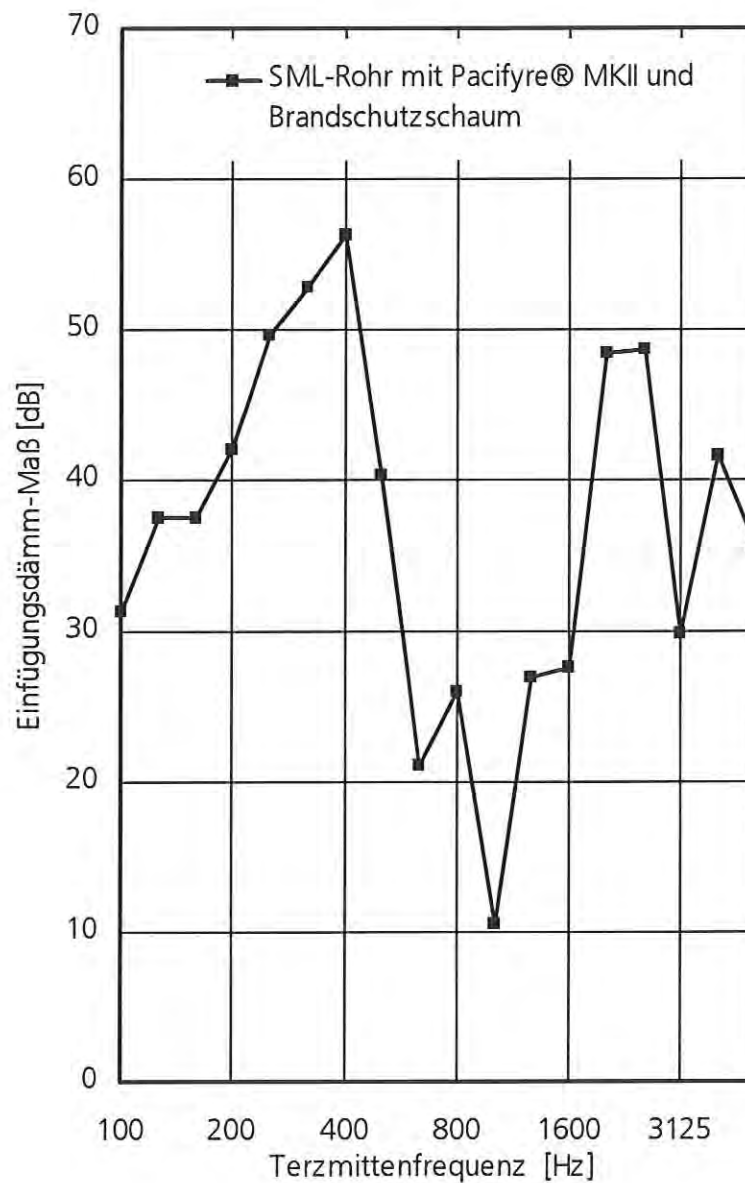


Fig. 3

Frequency-dependent insertion loss of the fire protection sleeve "Pacifyre® MKII" with approval number Z-19.17-1737 of J. van Walraven B.V. in connection with pipes of SML. The specimens were installed by means of "Henkel Tangit FP550 – fire protection foam". A pipe without fire protection sleeve rigidly moulded by means of mortar served as reference.

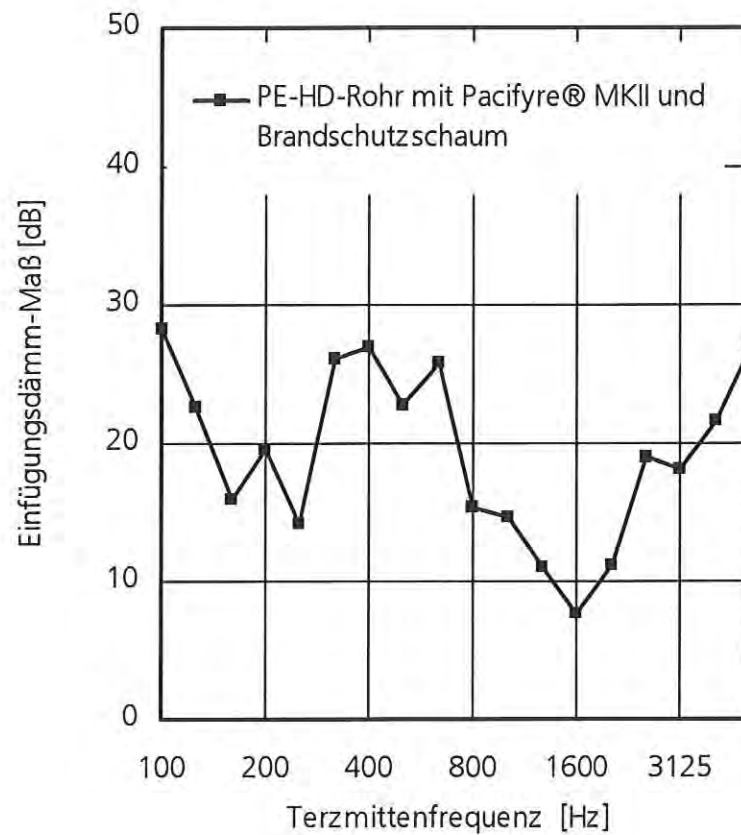


Fig. 4

Frequency-dependent insertion loss of the fire protection sleeve "Pacifyre® MKII" with approval number Z-19.17-1737 of J. van Walraven B.V. in connection with pipes of PE-HD. The specimens were installed by means of "Henkel Tangit FP550 – fire protection foam". A pipe without fire protection sleeve rigidly moulded by means of mortar served as reference.

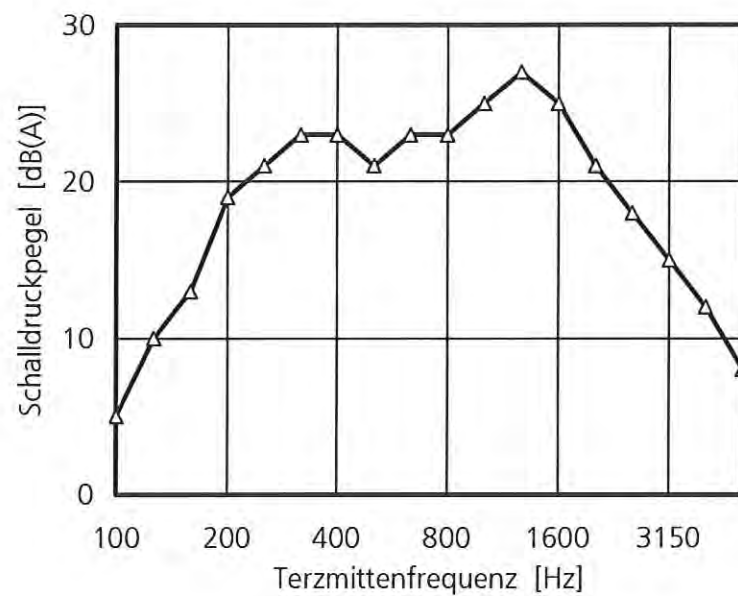


Fig. 5

Spectrum of a waste water system made of SML pipes measured behind the installation wall in the installation test facility of the Fraunhofer Institute for Building Physics at a volume flow of 2 l/s. Sound transmission was effected primarily via the concrete-covered ceiling breakthrough with this test set-up.