

MATERIAL AKUSTIK & INSULASI

pada Bangunan



Pembicara 1

YANA MUHAMADINAH

Acoustic Product Consultant
at Acourete



Pembicara 2

RETNO AJENG PRATIWI

Acoustic Product Consultant
at Acourete



Host

R. ARIEF YUDISTIRA

Head Sales at Acourete

PESERTA

Mahasiswa/i Program Studi Arsitektur

POIN PEMBAHASAN

- Acourete Company Profile
- Prinsip Dasar Akustik & Insulasi
- Material Akustik & Insulasi pada Bangunan
- Contoh Pemasangan Material



Live di Aplikasi



Selasa, 11 November 2025 (09.00 - 11.00)

#MenujuSuaraBaik

MANFAAT

- Wawasan baru
- Materi presentasi
- Rekaman ulang webinar
- E-Certificate

FREE

Link Pendaftaran:

<https://bit.ly/AGC21UNS>



Outline.

Acourete Company Profile

Prinsip Dasar Akustik

Material Akustik & Insulasi

*Studi Kasus (Contoh
Pemasangan Material)*

ABOUT **OUR COMPANY**

Distraction takes many forms in various locations, such as rain, footsteps, engine noise, airplanes, road traffic noises, and music. In addition to the various disturbance challenges, there are also architectural challenge where materials must be able to blend in with the architectural design. Then, physical challenges in the form of extreme conditions such as humidity, air temperature, dust, and others.

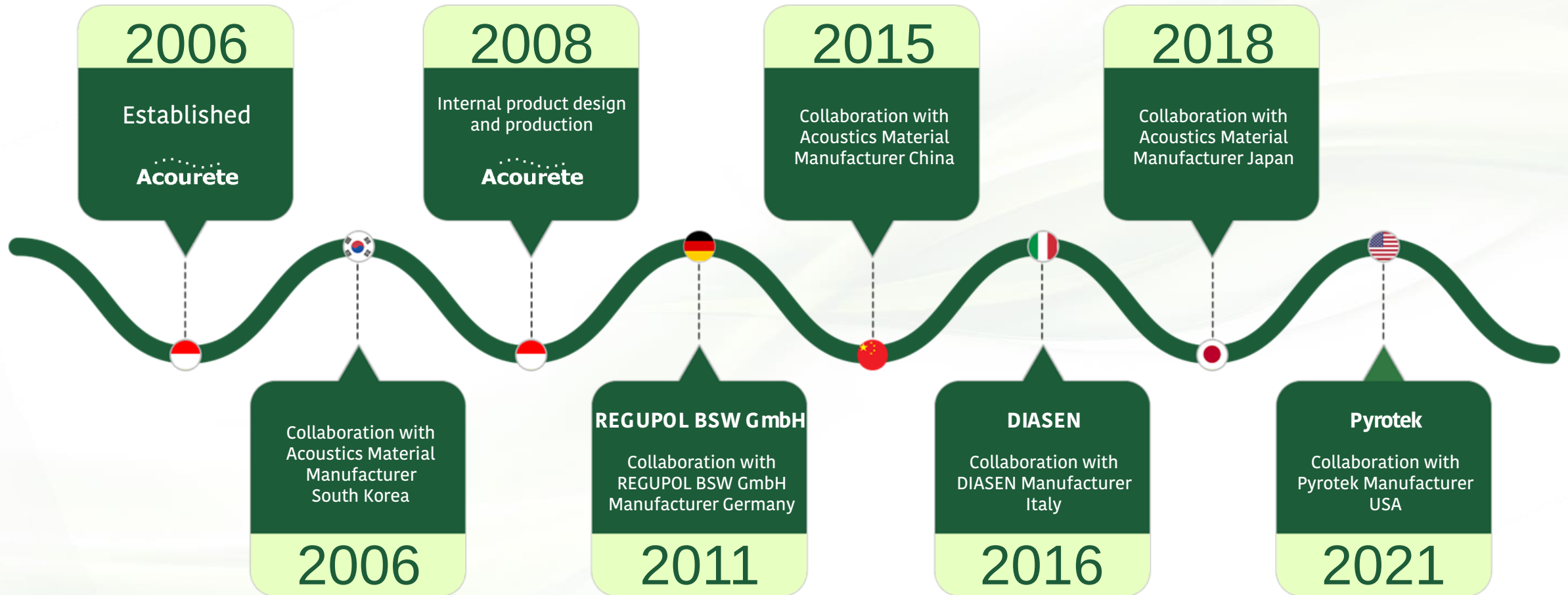
Since 2006 Acourete (Acoustic Revolutionary Technology) has been present in Indonesia to answer all the challenges that have been mentioned. With the spirit of revolutionary thinking, Acourete comes with revolutionary technology, to answer various challenges that are difficult to overcome with generic products available in the market.

We have best revolutionary material solutions,

1. High acoustic performance
2. Easy to apply
3. Blend with design challenges and environmental conditions
4. Meet the criteria for green and healthy buildings.

Come join us to carry out the Technological Revolution to produce healthy sound quality !

PRODUCT DEVELOPMENT OF ACOURETE ACOUSTICS





Acoustics for Transports
Noise Control inside the transportation



Architectural Acoustics
Noise Control Around The Room



Building Acoustics
Noise control from Around The Building or Room



Acoustics for Industrial
Industrial Machinery Noise Control and Around The Room



Acoustic Treatment
Noise Control for Better Quality

OUR CLIENT

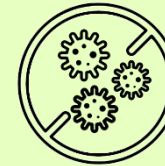
For almost 20 years, Acourete has been trusted to assist in completing more than 100 acoustic projects



WHY YOU SHOULD CHOOSE **ACOURETE**

Excellent acoustic performance

Safety and healthy testing/certification



Good manufacturing process



Recycled material



Green labeled products

Dasar Akustik

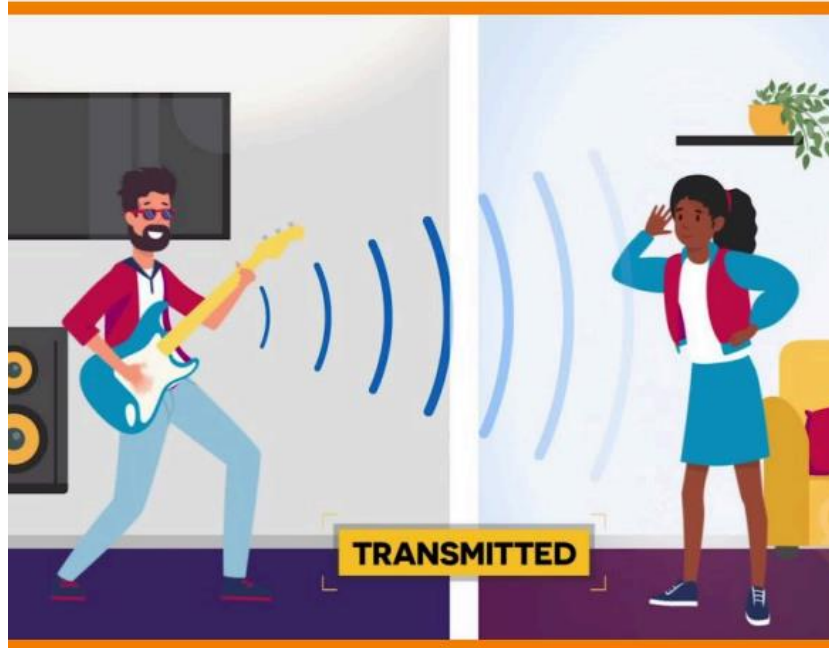
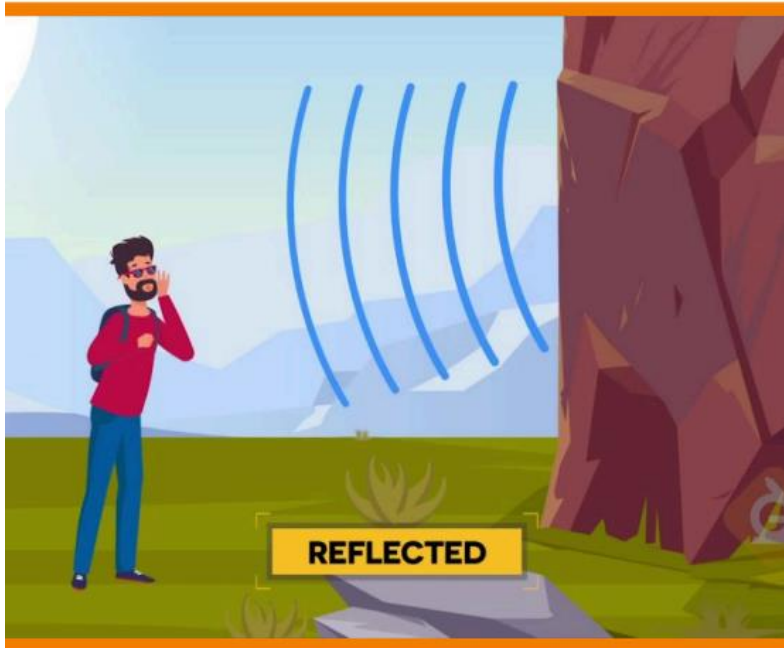
AKUSTIK DALAM BANGUNAN ARSITEKTUR

Akustika Bangunan – insulasi suara.
Bagaimana suara merambat dan
berpindah melalui partisi?

Akustika Arsitektural – akustik ruang.
Bagaimana suara berperilaku dalam
ruangan dan memantul pada
permukaan ruang.



Sound can be **reflected**, **transmitted**, and **absorbed**



<https://www.generationgenius.com/wp-content/uploads/reading-material/wave-reflection-absorption-transmittance-reading-material-grades-6-8.pdf>

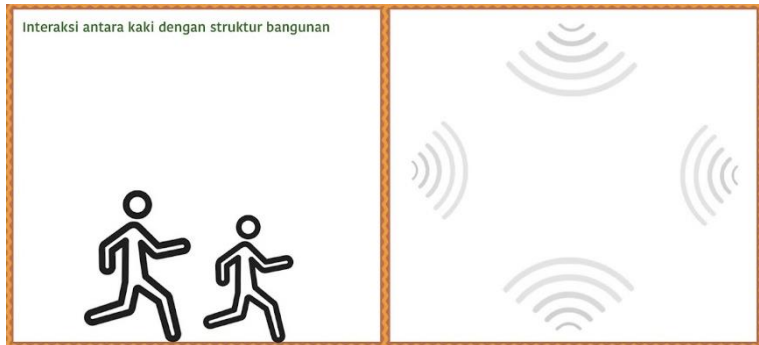
Suara berperilaku berbeda berdasarkan **permukaan** ruangan dan **frekuensi** karakteristik suara tersebut

PERILAKU SUARA MENIMBULKAN **MASALAH KEBISINGAN**

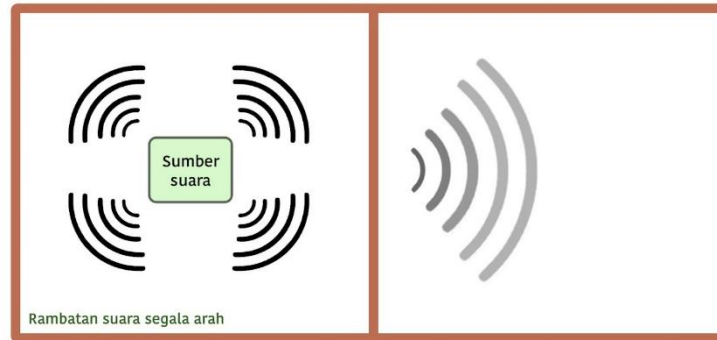
NOISE: lingkungan yang berisik atau bising.



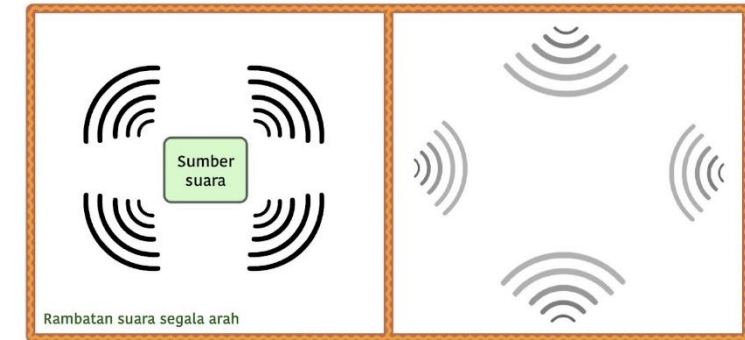
JENIS-JENIS KEBISINGAN (NOISE)



Impact Noise



Air-borne Noise



Structure-borne Noise

MATERIAL INSULASI SUARA dibutuhkan untuk mitigasi kebisingan.

PERILAKU SUARA MENIMBULKAN **MASALAH AKUSTIK RUANG**

Masalah akustik ruang: terlalu bergaung/gema, suara terdengar tidak jelas.

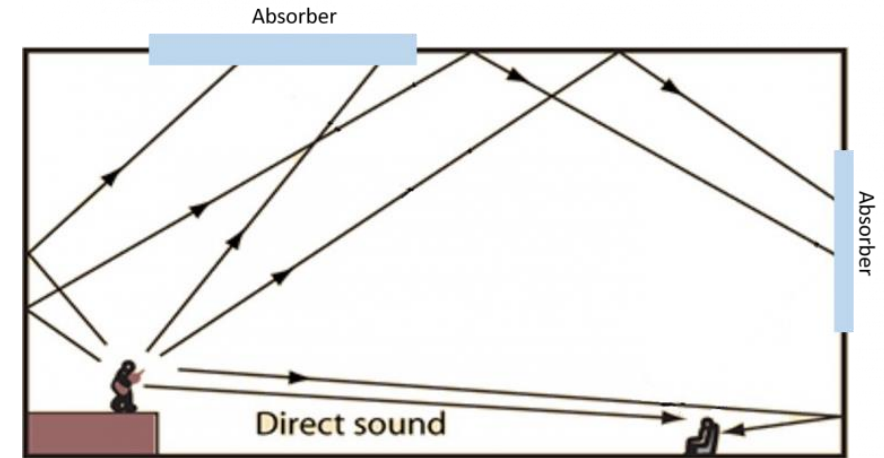
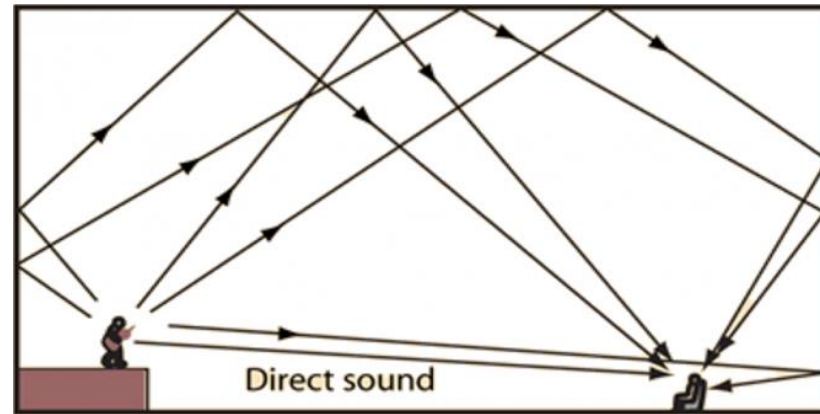


PERMASALAHAN AKUSTIK RUANG

Didominasi material reflektor

Bentuk ruangan

Peletakkan pengeras suara (speaker)



MATERIAL AKUSTIK (ABSORBER, DIFUSER, REFLEKTOR)

dibutuhkan untuk mengatasi permasalahan tersebut.

Online course by Acourete

**Acourete**
OnlineCourse

**UNS**
UNIVERSITAS
SEBELAS MARET

~~IDR 999.000,-~~
IDR 159.000,-
Equivalent to **USD 9,3**

Kode Promo:
ARSITEKTURFTUNS

KURSUS ONLINE AKUSTIKA BANGUNAN

Belajar dan memahami akustika bangunan dengan mudah kapan saja dan di mana saja.

BENEFIT

- Menunjang pekerjaan terkait akustik
- Wawasan best practice Akustika Bangunan
- Nilai tambah desain Akustika Bangunan
- E-certificate Akustika Bangunan

DAFTAR SEKARANG!

<https://bit.ly/AkustikaBangunanCourse>

 +62 858-6459-5911

Platform by
 **kajabi**





E-BOOK RE-LAUNCH

UPDATED VERSION

21.03 -> 25.09

FREE DOWNLOAD!

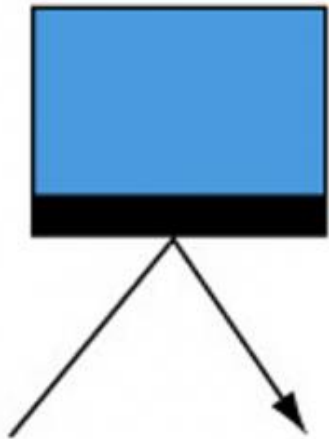
<https://bit.ly/UnduhBukuAkustikaArsitektur>

Buku-buku Acourete lainnya

- Download ebook "Teori & Aplikasi Akustika Bangunan" di <https://acourete.com/buku-akustika-bangunan-lengkap/>
- Download ebook "Teori & Aplikasi Akustika Arsitektur" di <https://acourete.com/unduh-gratis-ebook-architectural-acoustics/>
- Download ebook "Menilik Kenyamanan Suara (Kebisingan) pada Moda Transportasi Kapal Laut" di <https://acourete.com/acoustics-transportation-buku-akustik-kapal-laut/>
- Download ebook "Panduan Desain Akustik Studio Produksi Konten Suara Profesional (Musik, Percakapan, dan Spesial Efek)" di <https://bit.ly/StudioRekamanProfesional>

Material Akustik.

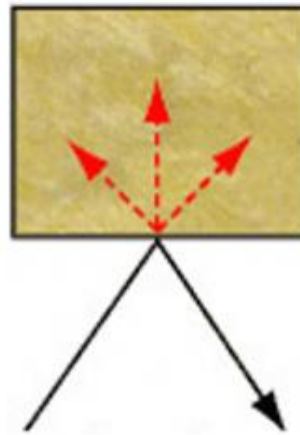
MATERIAL AKUSTIK



Refleksi



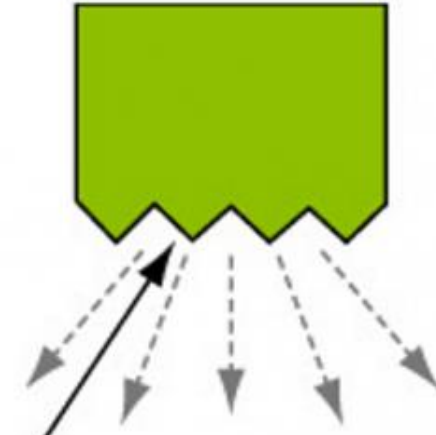
Material Insulasi



Absorpsi



Material Absorber



Difusi



Material Diffuser

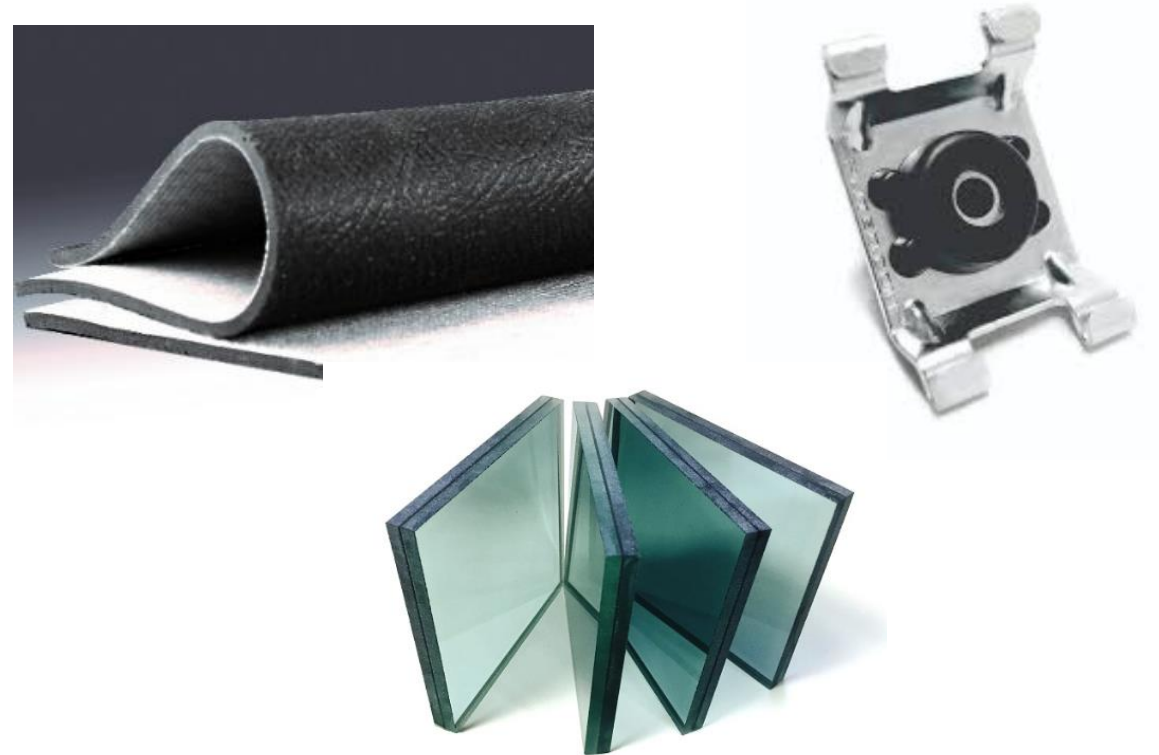
MATERIAL AKUSTIK – INSULASI SUARA

Karakteristik Material

High density

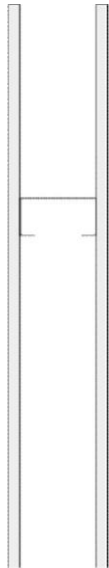
High mass

Non-porous



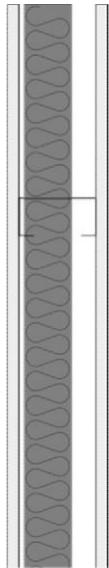
*Insulation performance rated using **STC (Sound Transmission Class)***

Perbandingan Partisi dengan & tanpa Insulasi



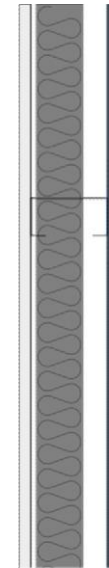
*Without
insulation
material*

STC 36
OITC 23



*With insulation -
rockwool*

STC 41
OITC 26

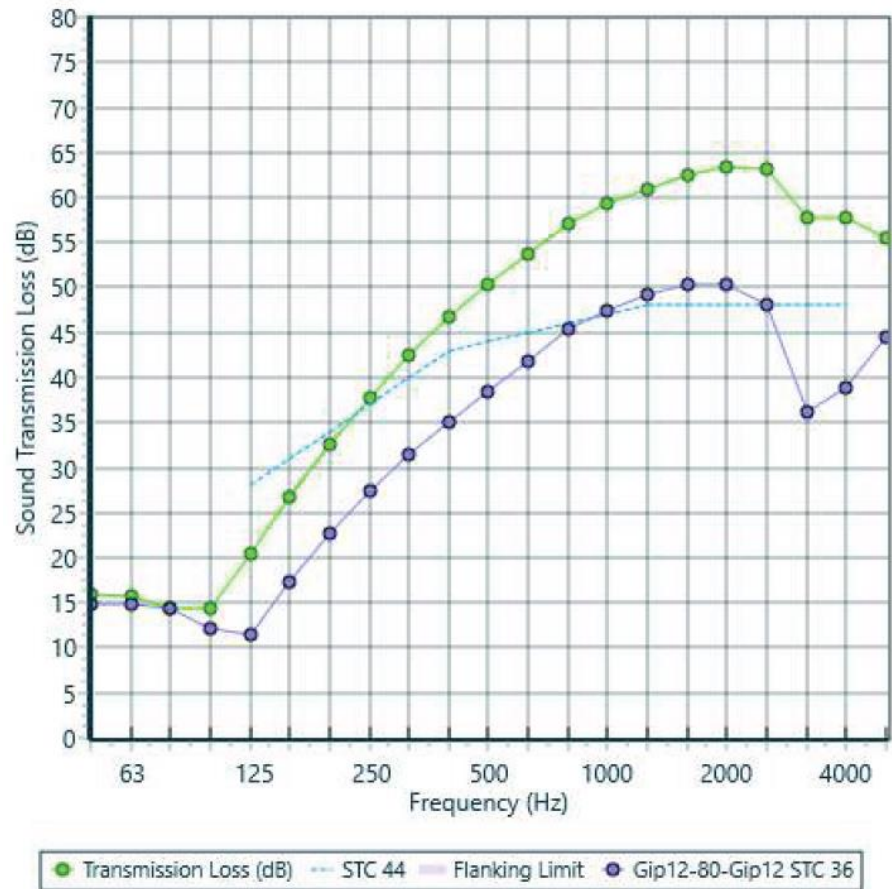


*With insulation -
rockwool &
Acourete Noise Armour*

STC 44
OITC 28



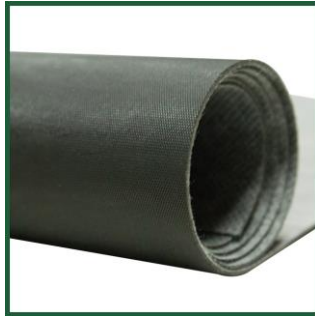
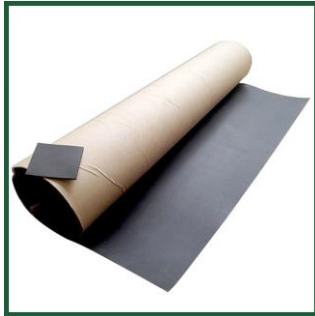
Contoh nilai transmission loss dan rating STC partisi



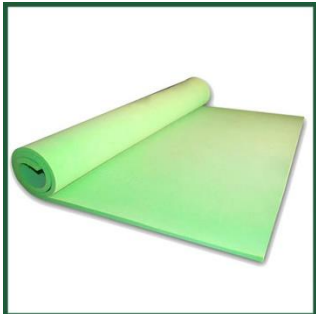
DENGAN MATERIAL INSULASI
STC 44

TANPA MATERIAL INSULASI
STC 36

MATERIAL INSULASI SUARA ACOURETE



Material Insulasi Suara Untuk Dinding & Atap



Material Insulasi Getaran & Impact Lantai

MATERIAL INSULASI SUARA – DINDING & ATAP



Acourete Fiber

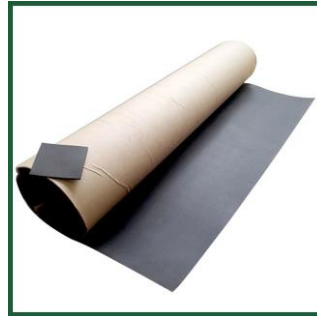
Busa peredam suara berbahan *poly-propylene* halus.

NRC 0.8

Densitas 150 kg/m³

Ukuran 1 m x 1,5 m

Tebal 10 mm



Acourete Noise Armour

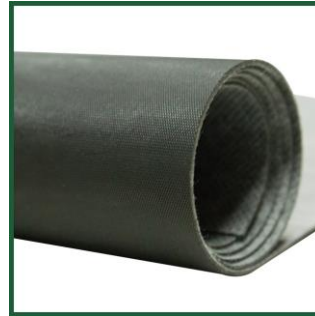
Material insulasi suara *viscoelastic mass-loaded vinyl*.

STC 24

Densitas 2000 kg/m³

Ukuran 1 m x 1 m

Tebal 2 mm



Acourete Silent Wall

Material insulasi suara *Polyvinyl Chloride* (PVC).

STC 23

Densitas 1800 kg/m³

Ukuran 5 m x 0,94 m

Tebal 2 mm



Acourete Silent Wall Pattern

Material insulasi suara *Polyvinyl Chloride* (PVC) yang memiliki finishing motif kayu.

STC 19

Densitas 1750 kg/m³

Ukuran 1 m x 1 m

Tebal 1,2 mm



Acourete Regupol Sonusclip SC100

Material klip pemutus getaran struktur pada dinding dan langit-langit.

ACOURETE FIBER 1000 Karaoke Room

ACOURETE FIBER 1000 Auditorium

Mandiri Executive Club



ACOURETE SILENT WALL Meeting Room



ACOURETE SILENT WALL VVIP Karaoke Room

ACOURETE SILENT WALL Auditorium



ACOURETE SILENT WALL PATTERN

*ACOURETE SILENT
WALL PATTERN
FGD Room*

ACOURETE NOISE ARMOUR



*ACOURETE
NOISE ARMOUR
Meeting Room*



*ACOURETE
NOISE ARMOUR
Office*

ACOURETE REGUPOL SONUSCLIP SC100



Framing: 3-5/8" Steel Studs, 20 Gauge, 16" o.c.
Insulation: 3-1/2" Fiberglass
Isolation: None – direct applied
Side 1: 5/8" Gypsum Wall Board
Side 2: 5/8" Gypsum Wall Board



Framing: 3-5/8" Steel Studs, 20 Gauge, 16" o.c.
Insulation: 3-1/2" Fiberglass
Isolation: sonusclips with Hat Channel
Side 1: 5/8" Gypsum Wall Board
Side 2: 5/8" Gypsum Wall Board



Framing: 3-5/8" Steel Studs, 20 Gauge, 16" o.c.
Insulation: 3-1/2" Fiberglass
Isolation: sonusclips with Hat Channel
Side 1: Two 5/8" Gypsum Wall Boards
Side 2: 5/8" Gypsum Wall Board



Courtesy of Regupol

MATERIAL INSULASI SUARA – LANTAI



Acourete Regupol Vibration 300

Material peredam getaran pada mesin.

Max Load: 5 TON/M2



Acourete Regufoam Vibration 150Plus

Busa peredam getaran berfrekuensi rendah.

Max Load: 1,1 TON/M2



Acourete Regupol Vibration 200

Material peredam getaran pada lantai.

Max Load: 2 TON/M2



Acourete Regupol Sound 12

Peredam getaran *underscreed* lantai.

Max Load: 3 TON/M2



Acourete Regupol Sonus Multi 3

Peredam getaran lantai
Acoustics Underlayer.

*Underscreed – di
bawah konkret
Mesin, beban berat*

*Underscreed – di bawah konkret
Langkah kaki, olahraga, gym, subwoofer*

*Underlayer – di bawah
finishing lantai
Langkah kaki*

REGUPOL VIB. 300

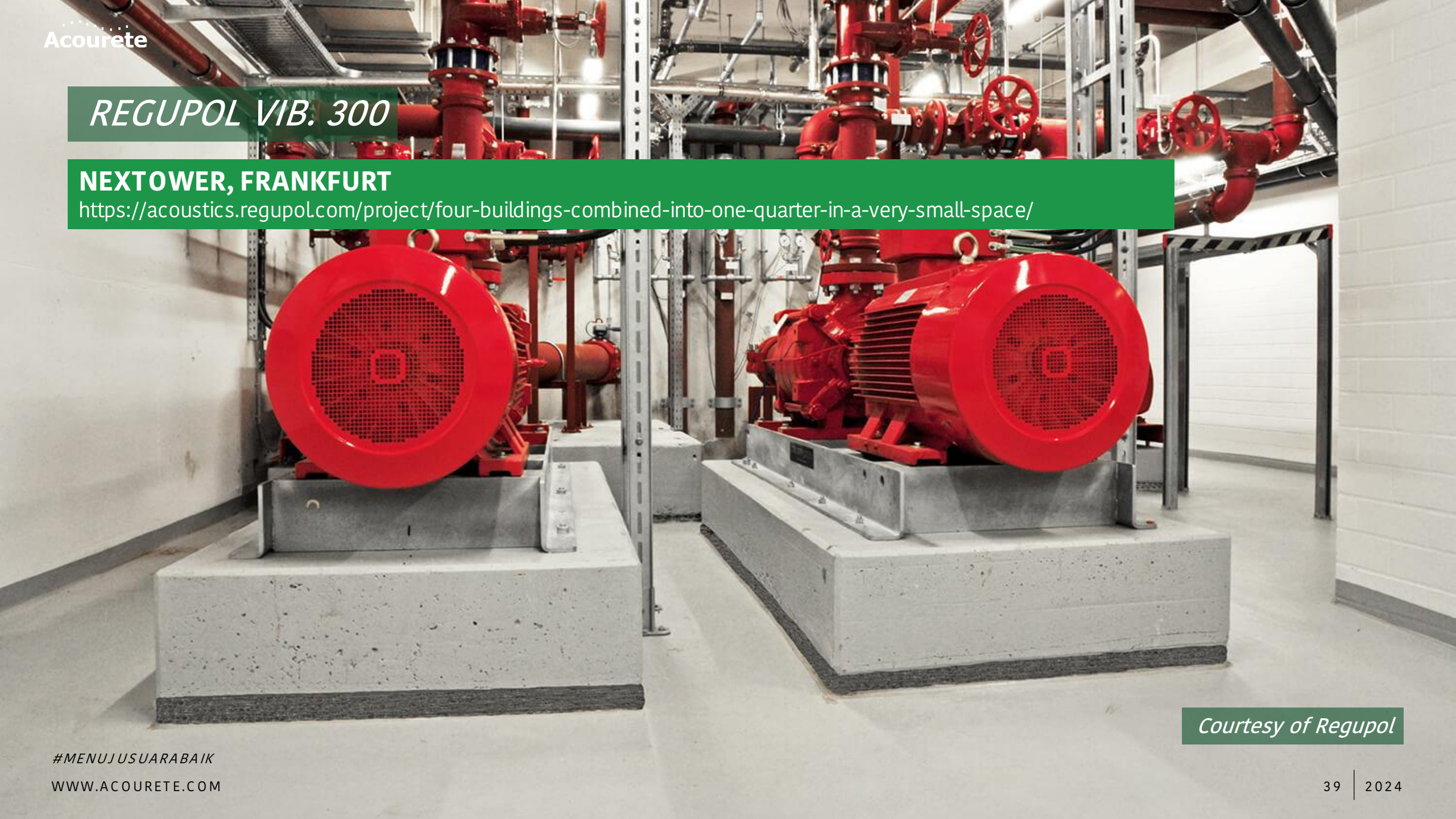


Courtesy of Regupol

REGUPOL VIB. 300

NEXTOWER, FRANKFURT

<https://acoustics.regupol.com/project/four-buildings-combined-into-one-quarter-in-a-very-small-space/>



Courtesy of Regupol

*REGUPOL
VIB. 480*

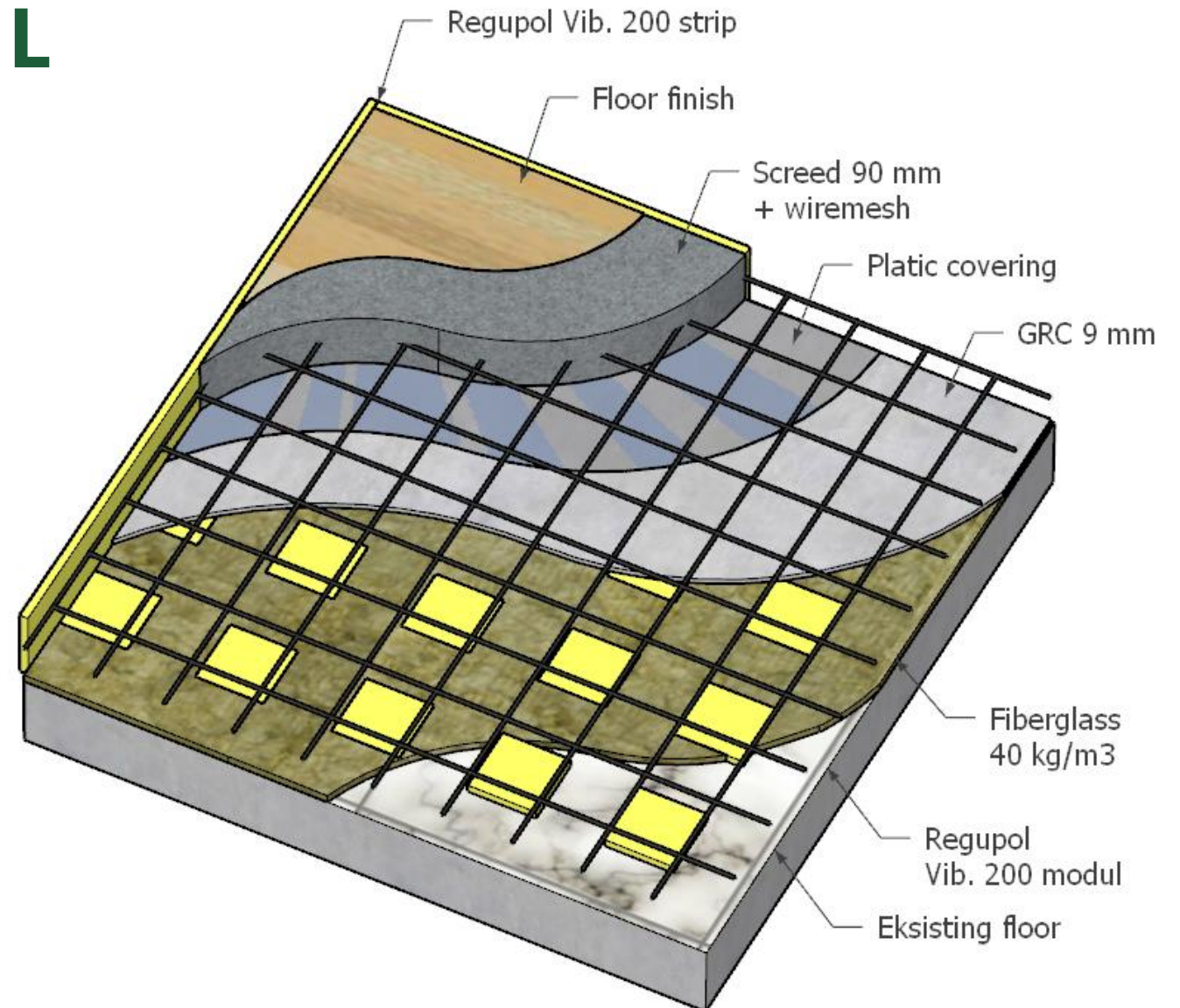


REGUFOAM VIB. 150
Entertainment Room



REGUFOAM VIB. 150 Entertainment Room

ACOURETE REGUPOL VIBRATION 200



Home theater

Pemasangan Acourete Regupol 200

Pemasangan Acourete Regupol 200

Drum stage



Acourete Regupol Sound 12



Sumber:
L3B Construction & Rénovation

Acourete Regupol Sound 12

Sumber:
I3B Construction & Renovation

Acourete Regupol Sound 12

Acoustical Performance	Standard	Result	Comment
90 mm cement screed, REGUPOL sound 12, 140 mm concrete slab	DIN EN ISO 10140-3 DIN EN ISO 717-2	ALw ≥ 33 dB	According to ETA: ALw ≥ 31 dB

Supplier:
L3B Construction & Rénovation

Acourete Regupol Sonus Multi 3 Studio Musik

Acoustical Performance	Standard	Result
<i>Under sheet vinyl:</i>		
2 mm sheet vinyl,	AS ISO 717.2-2004	ALw 18 dB
REGUPOL sonus multi 3	ISO 140-8:2006 (E)	Lnw 59 dB
	ISO 140-6-2006	IIC 52
	ASTM E989-89	
*Assembly from top to bottom		



*Acourete Regupol
Sonus Multi
Studio Band*

PLAYFUL

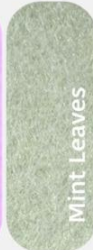


Sumber Gambar:
 Yellow Slide: https://swingslide.com/super-scoop-slide-yellow-6-deck/?srsltid=AfmB0orjGF-aFDOYHAYw4_bzr55eke7ACICY602WIFMQmCWWoUit_Q2h
 Green Playground: <https://brightdaybigblocks.com/for-kids/?srsltid=AfmB0opbl.da730pUvObfRg9wOdjzP1XsaLeaChcY-6nPwwU/NrXFBV>
 Orange Tabletop Balloon Dog Sculpture: <https://www.instagram.com/p/DGLZ1QwMufG/>

Polling Warna



PASTEL



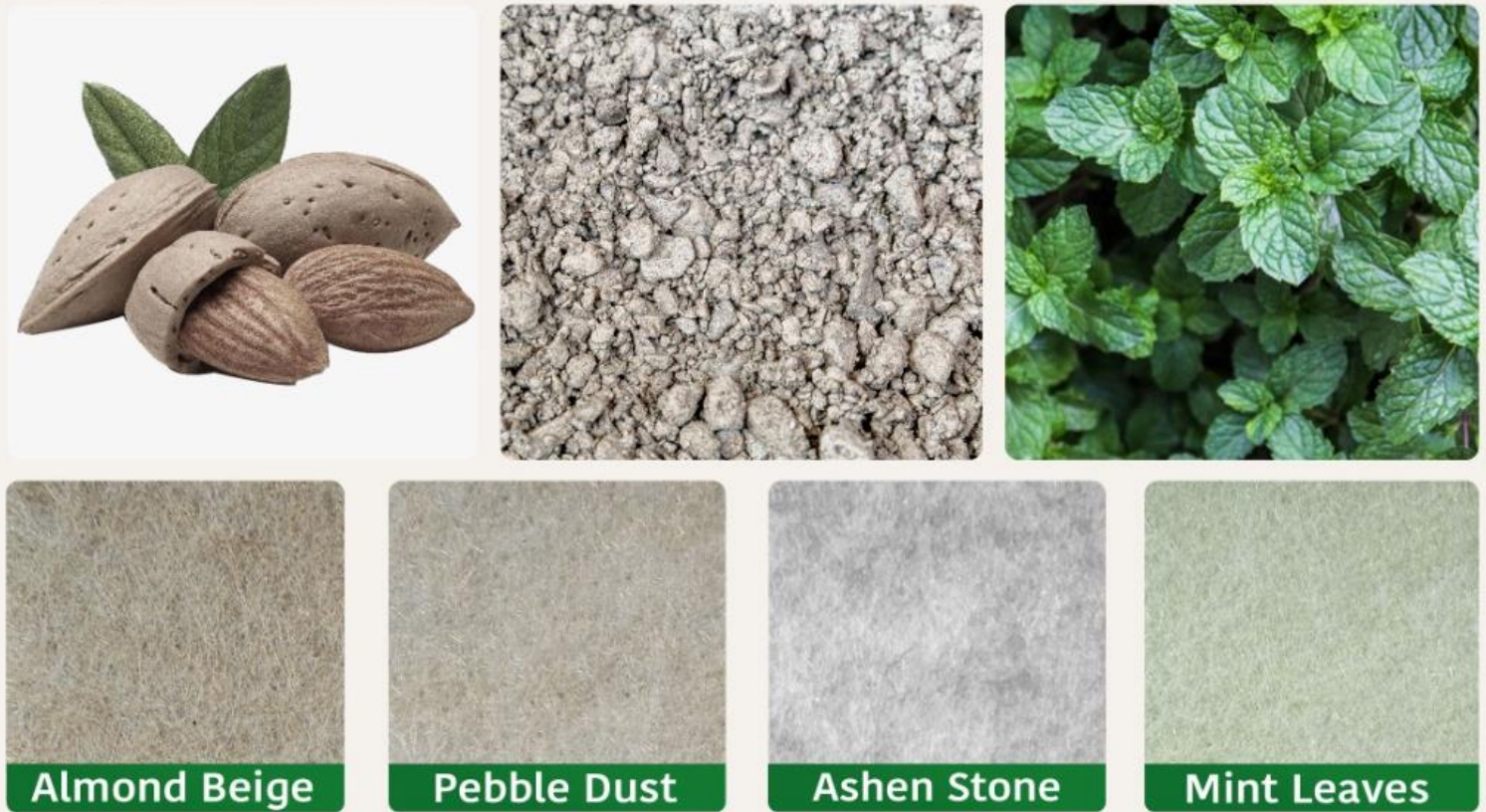
Polling Warna



NATURE

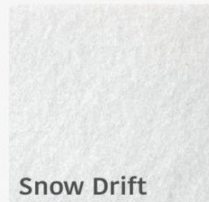


Polling Warna



Sumber Gambar:
 Almond: <http://nischalam.com/product/almond-badam-250gm/>
 Pebble Dust: <https://www.thespruce.com/stone-dust-great-setting-bed-for-pavers-2132528>
 Mint Leaves: https://www.harvest.co.uk/how-to-grow-mint/?srsltid=AfmB0op0uEZiBp6XLqUkugG-edFs-L03gec0QDH0ccGh_4qJN_jo_1M

MONOCHROME



Polling Warna



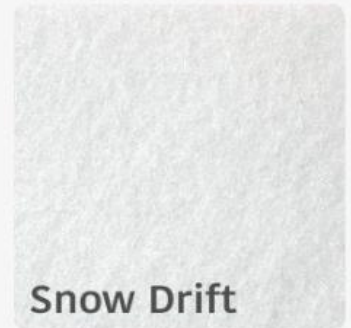
Graphite Stone



Earthy Grey

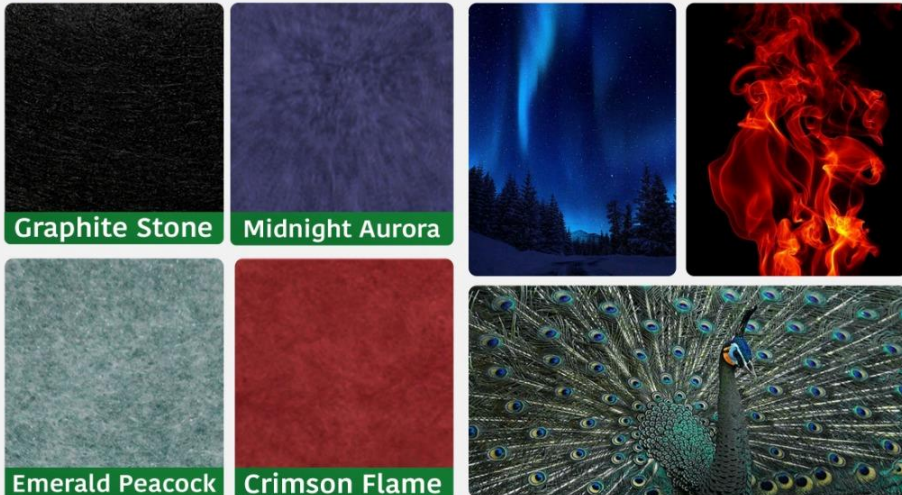


Ashen Stone



Snow Drift

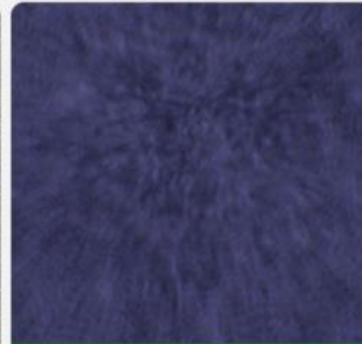
BOLD



Polling Warna



Graphite Stone



Midnight Aurora



Emerald Peacock



Crimson Flame

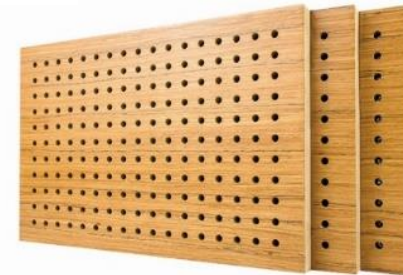


MATERIAL AKUSTIK – **ABSORBER (PENYERAP)**

Low density

Low mass

Porous



Absorption performance rated using **NRC (Noise Reduction Coefficient)**



Before Treatment

After Treatment

Suara Ucap	Choir	Musik
		

Suara Ucap	Choir	Musik
		

MATERIAL ABSORBER SUARA ACOURETE



Acourete Echobaffle/ FIBER 1000

Panel akustik fabrikasi yang memiliki redaman suara pada frekuensi *treble*.

NRC 0.8
Ukuran 1 m x 1,5 m
Tebal 10 mm

Fabric looks



Acourete Board

Peredam suara polyester berpori berbentuk *softboard*.

NRC 0.47
Ukuran 0,6 m x 1,2 m
Tebal 9 mm

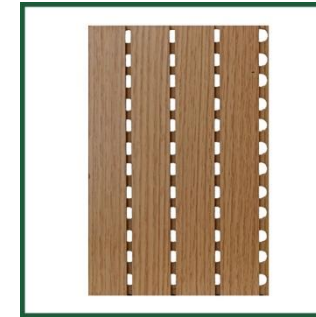


Acourete Perfowood

Panel akustik interior berlubang bernuansa kayu yang terbuat dari MDF.

NRC 0.66
Ukuran 0,6 m x 1,2 m
Tebal 12 mm

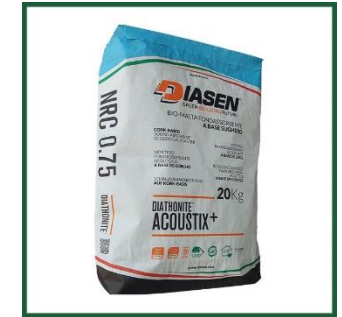
Wooden looks



Acourete Slatwood

Panel akustik interior beralur yang terbuat dari MDF.

NRC 0.67
Ukuran 0,6 m x 1,2 m
Tebal 12 mm



Acourete Diathonite Acoustix+

Material peredam suara sekaligus insulasi termal berbentuk semen untuk menyerap gelombang suara.

NRC 0.75
Tebal 3 cm

Cement looks

Acourete Fiber 1000 Meeting Room



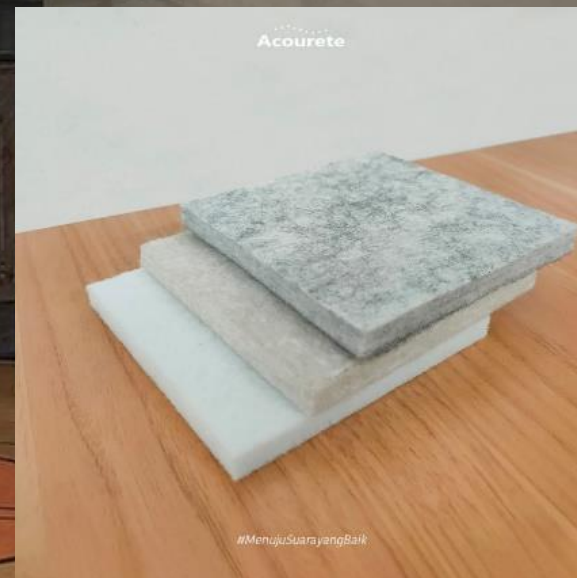
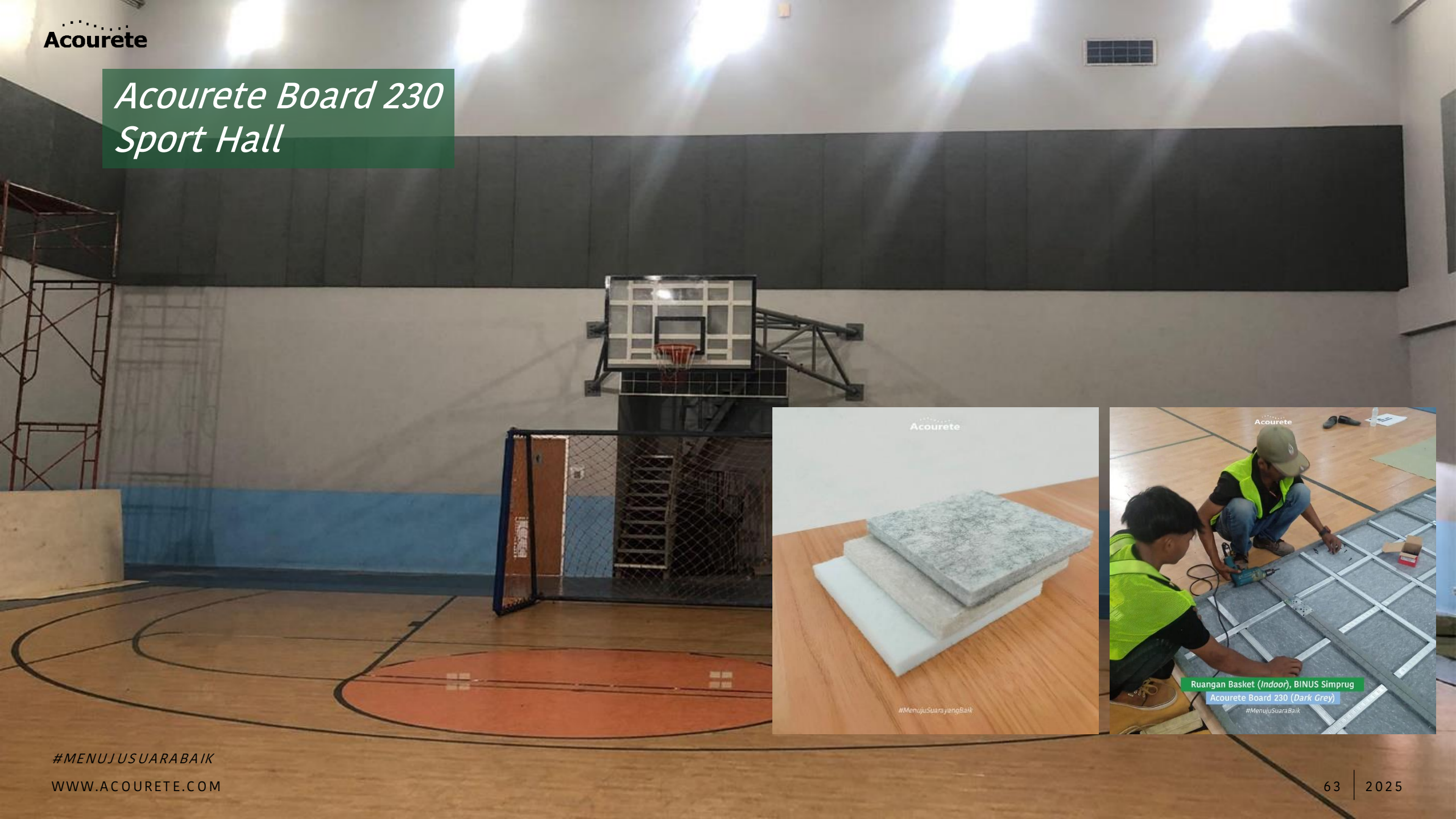
Acourete Fiber 1000 Cafeteria

Acourete Fiber 1000 Studio Musik

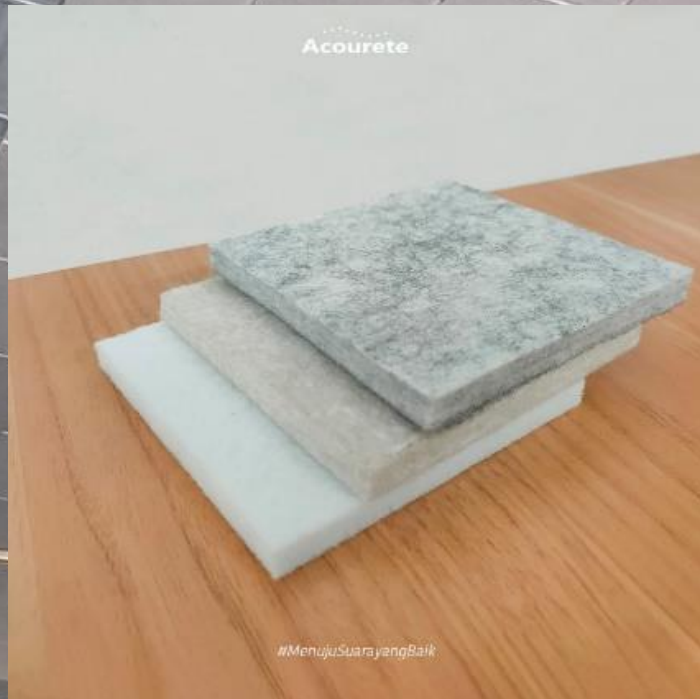
Acourete Fiber 1000 Home Karaoke



Acourete Board 230 Sport Hall



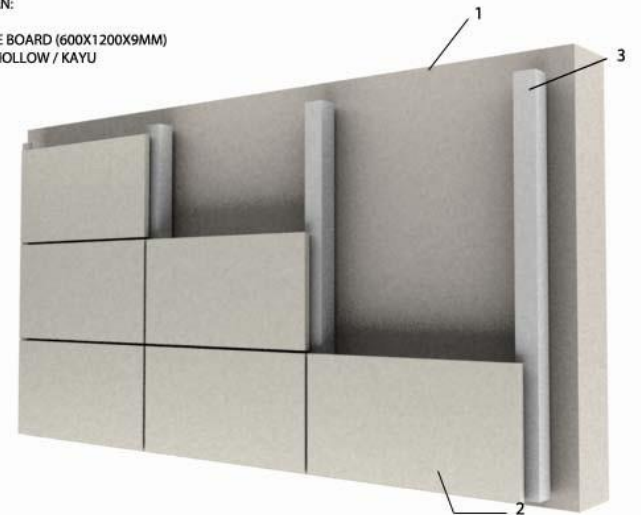
Acourete Board 230 Auditorium



Acourete Board 230 Ruang Musik



KETERANGAN:
1 DINDING
2 ACOURETE BOARD (600X1200X9MM)
3 RANGKA HOLLOW / KAYU

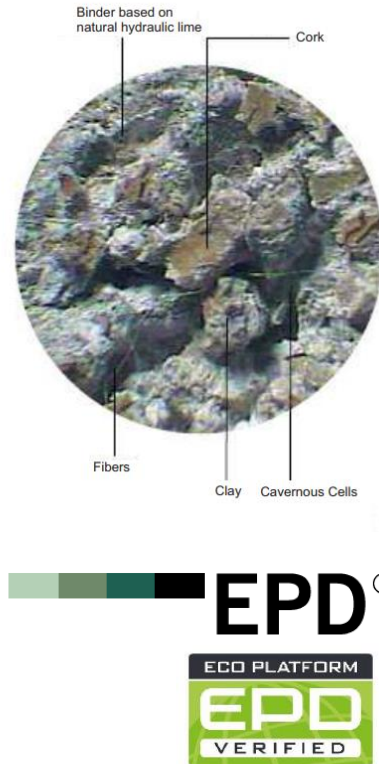


*Acourete Perfowood
Café & Resto*

Acourete Perfowood Gereja

Acourete Perfowood Auditorium

ACOURETE DIATHONITE ACOUSTIX+



Description	Value
Weighted sound absorption (SAA)	0.72
Fire resistance	EN ISO 13501-1 – Class A1 (no flame generation & no smoke emission)
Sound absorption class (thickness 3cm/ 1.18in)	C
NRC	0.75
Thermal resistance (R) (for 1cm/ 0.4 in thickness)	0.133 m ² K/W
Mechanical resistance	4 N/mm ²
Breathability (μ)	4
Thermal conduction (λ)	0.075W/mK
Density (yield)	3.70kg/m ² (±10%) per cm of thickness 1.92lb/ft ² (±10%) per inch of thickness
Color	Light Grey
Country of Origin	Italy

Allergy free, toxic free Low VOC, fire resistant, EPD certified

Broadcast Studio, Music Recording, Home Theater, Karaoke Room, Auditorium, Music Hall, Office

*Diathonite Acoustix+
with arghatarm acoustix and limepaint finishing
NRC 0.65*

*Diathonite Acoustix+
cork texture
NRC 0.75*

*Diathonite Acoustix+
with arghatarm acoustix finishing
NRC 0.65*

Courtesy of Diasen

Diathonite Acoustix+ limepaint texture



Courtesy of Diasen



Acourete

#MENUJUSUARABAIK
WWW.ACOURETE.COM



Courtesy of Diasen

Auditorium

Studi Kasus

Paramater Akustik

yang umum diukur

Problem Akustik	Parameter Desain	Referensi Standard
Kebisingan/ Insulasi Suara	NC (Noise Criterion)	ASHRAE Handbook 2011, Chapter 48
Kebisingan/ Insulasi Suara	Tingkat kebisingan dBA	SNI-03-6386-2000
Akustik Ruang	Waktu Dengung RT	SNI-03-6386-2000, DIN 18041:2016
Akustik Ruang	Kejelasan Suara – Clarity C80 (musik)	ISO 3382-1
Akustik Ruang	Kejelasan suara – Definition D50 (percakapan)	ISO 3382-1

Fungsi Pengukuran Akustik



Improvement



Design and Build



Pengukuran Akustik
Improvement

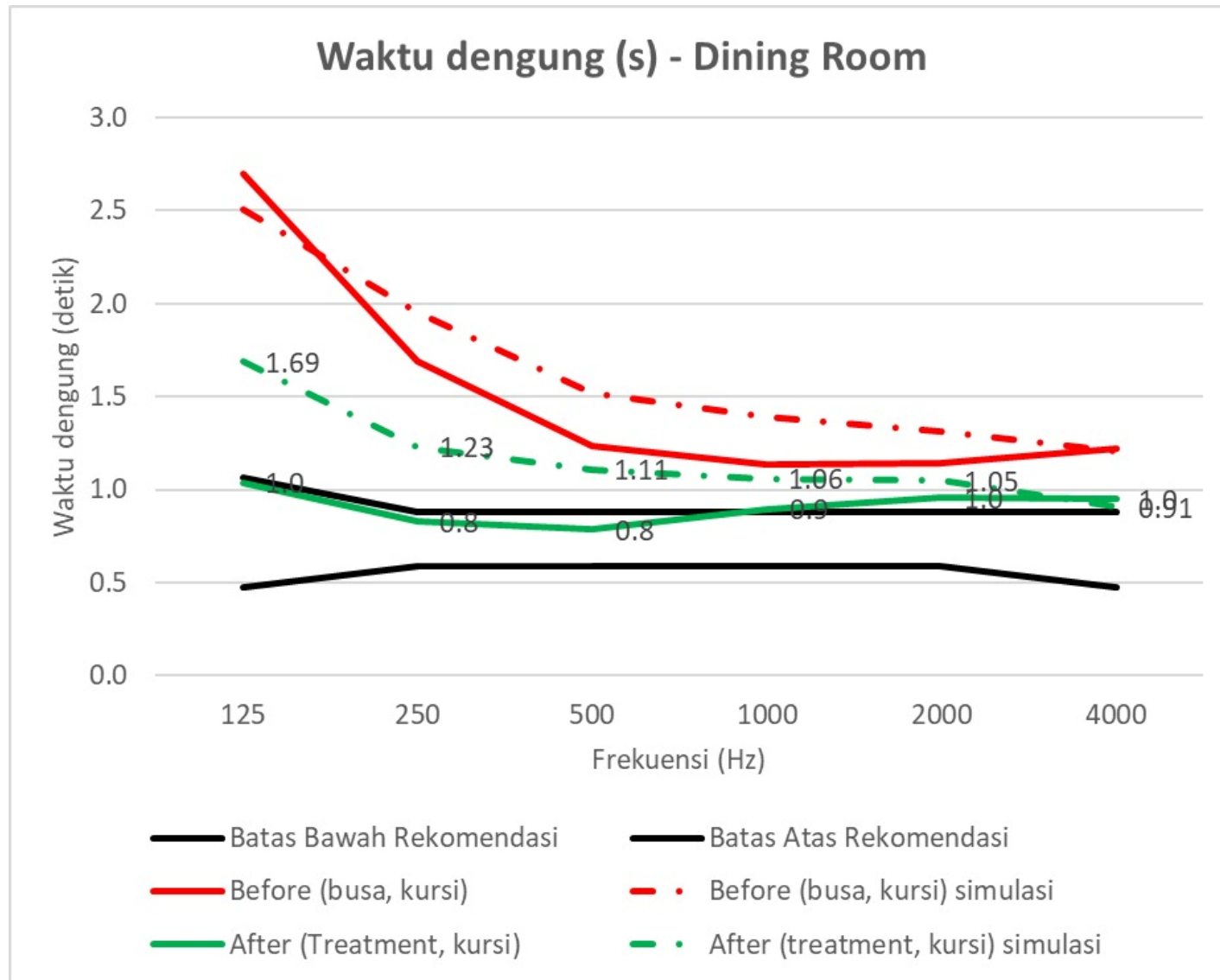
Dining Room

Pengukuran Waktu Dengung



Dining Room

Hasil Pengukuran Waktu Dengung



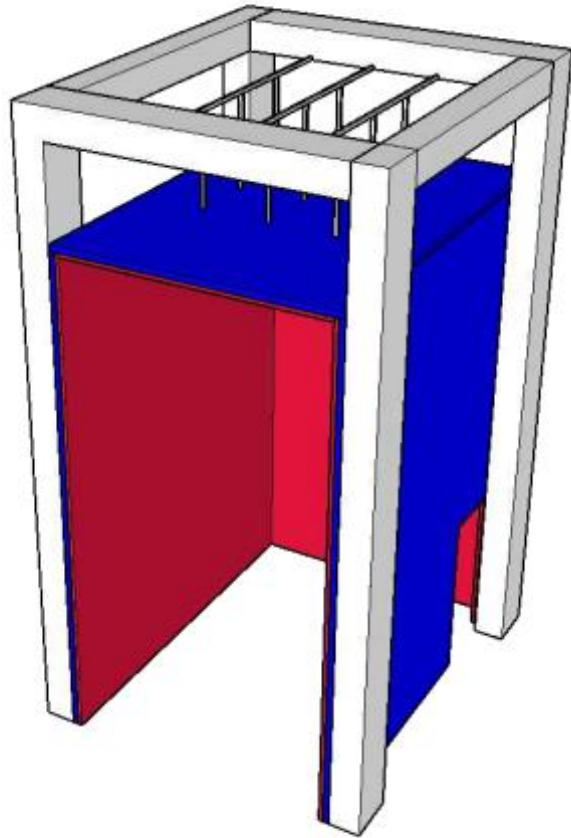
Dining Room

Dokumentasi

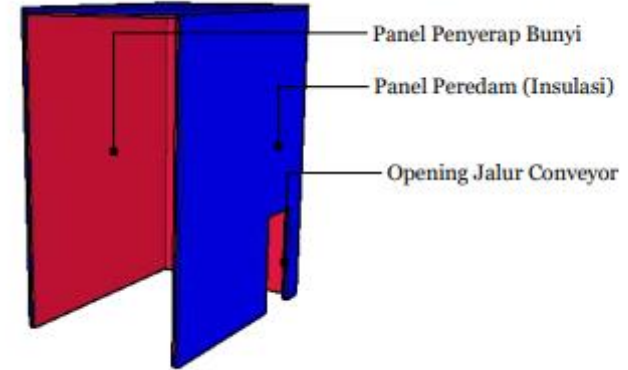


Ruang Mesin

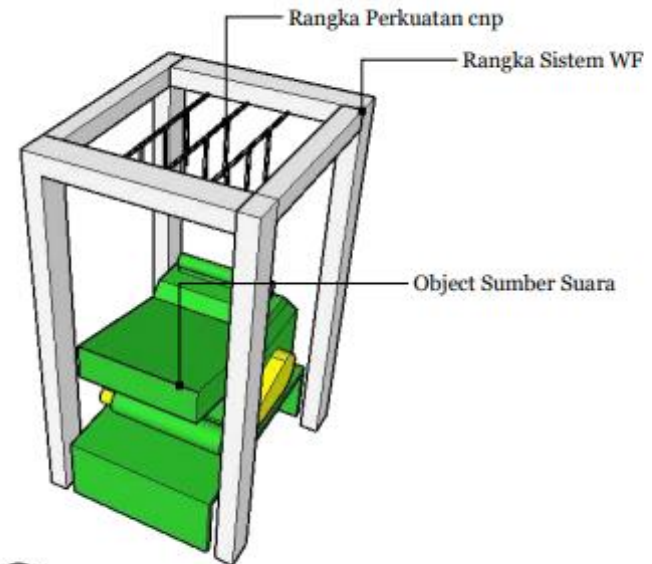
Rekomendasi Desain



○ Sistem Pekerjaan Insulasi



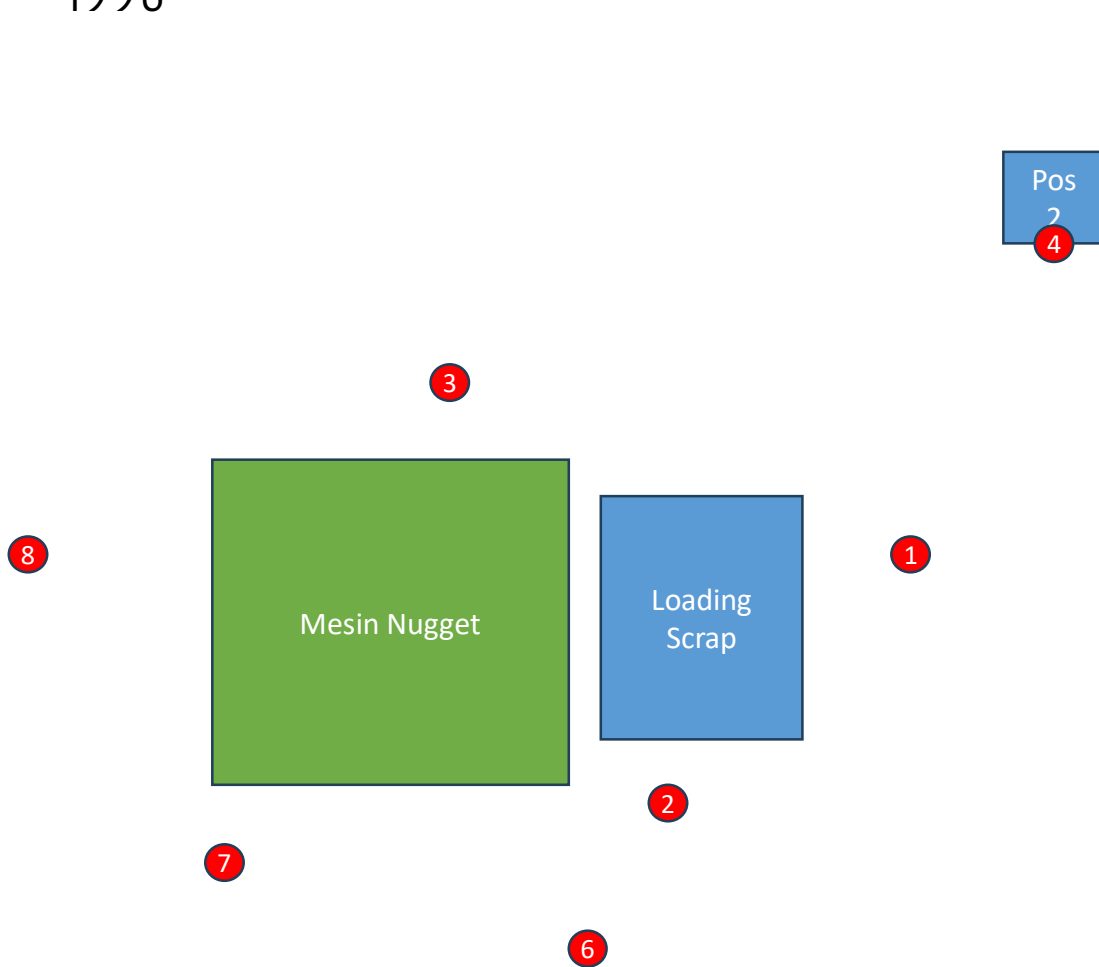
○ Sistem Peredam dan Penyerap Bunyi



○ Perangkatan Perkuatan Tambahan

Ruang Mesin

*Hasil Pengukuran Dampak Kebisingan
Sebelum dan Sesudah Insulasi Suara*
Acuan: Kepmen LH No. 48 Tahun
1996



5

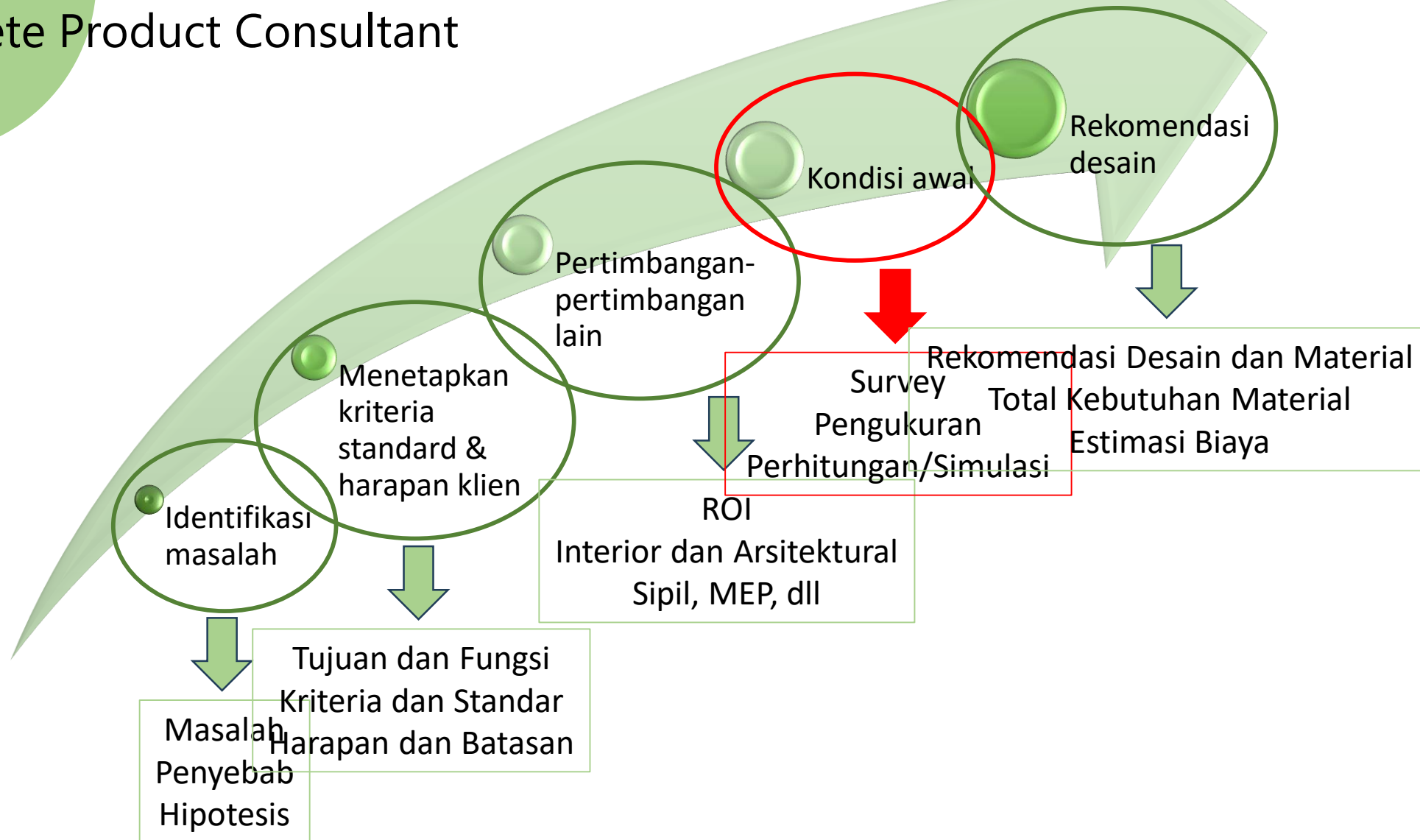
Titik	Area	Before (dBA)	After (dBA)	Pengurangan (dBA)
1	Loading Scrap	100	89	-11
2	Area Operator	101	95	-6
3	Conveyor Output	94	89	-5
4	Area Lingkungan	85	76	-9
5	Area Luar	76	65	-11
6	Area Belakang Operator	96	86	-10
7	Area Kanan Atas Mesin	100	89	-11
8	Area Belakang Mesin	90	86	-4



Pengukuran Akustik
Design and Build

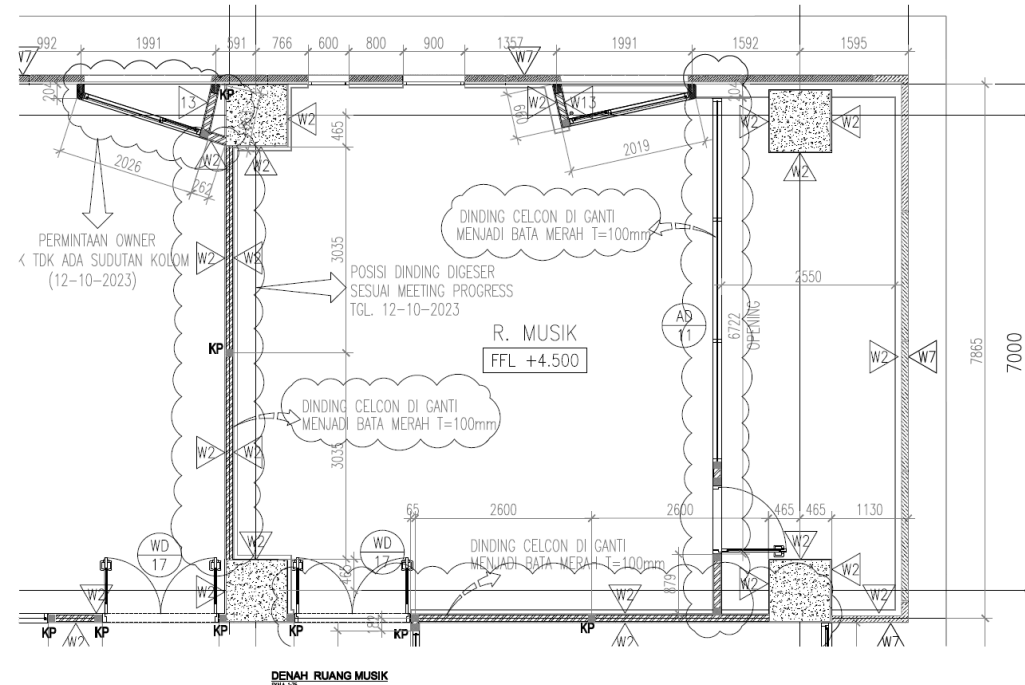
Alur Kerja *Design and Build*

Acourete Product Consultant



Studio Musik

Survey



STUDIO MUSIK

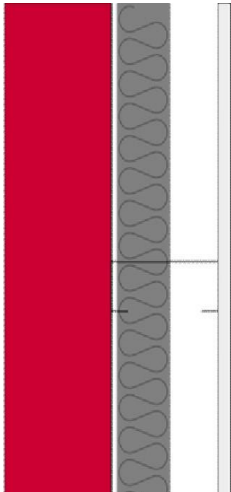
Denah studio musik

- Ukuran 7,9 x 10,2 m²
- Tinggi 4 meter (FSL)
- Ukuran pintu utama studio: (82,5 x 2) cm, tinggi 220 cm
- Ukuran pintu ruang monitor 90 cm tinggi 220 cm
- Ukuran pintu vocal booth (tidak ditreatment oleh Acourete)

Studio Musik

Rekomendasi Desain Insulasi Suara

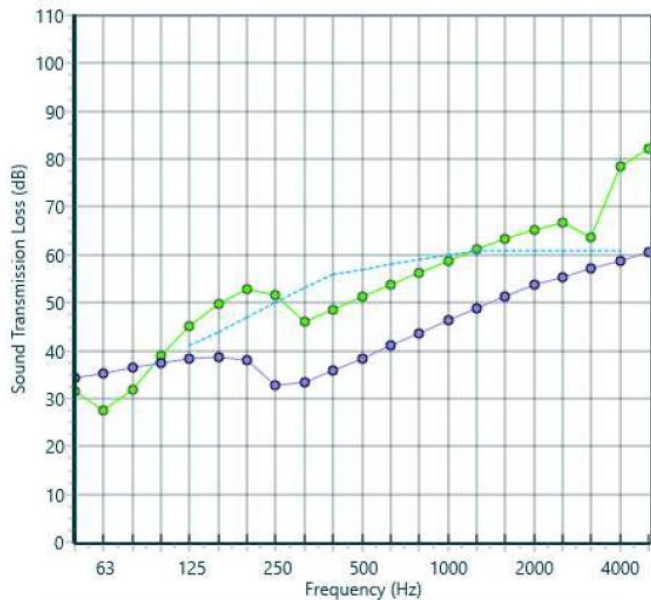
Alt 1



STC 57/OTC 48

Lapisan Insulasi Dinding :

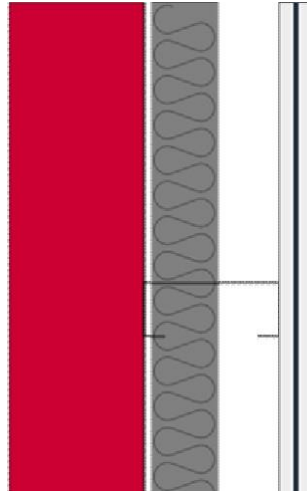
1. Bata merah (100 mm)
2. Rangka (100 mm)
3. Rockwool 80 kg/m³ (50 mm)
4. Gypsum (12 mm)



● Transmission Loss (dB) --- STC 57 --- Flanking Limit ● BRICK100 STC 44

Acourete

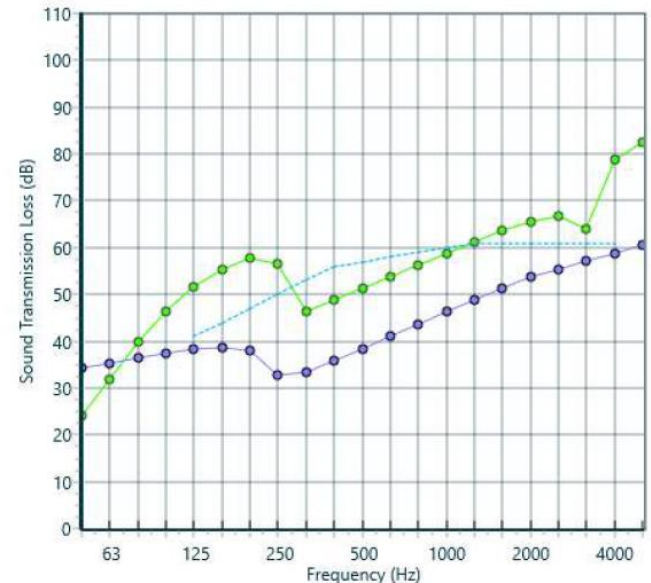
Alt 2



STC 57/OTC 53

Lapisan Insulasi Dinding :

1. Bata merah (100 mm)
2. Rangka (100 mm)
3. Rockwool 80 kg/m³ (50 mm)
4. Gypsum (12 mm)
5. Acourete Noise Armour (2mm)
6. Gypsum (12 mm)



● Transmission Loss (dB) --- STC 57 --- Flanking Limit ● Brick100 STC 44

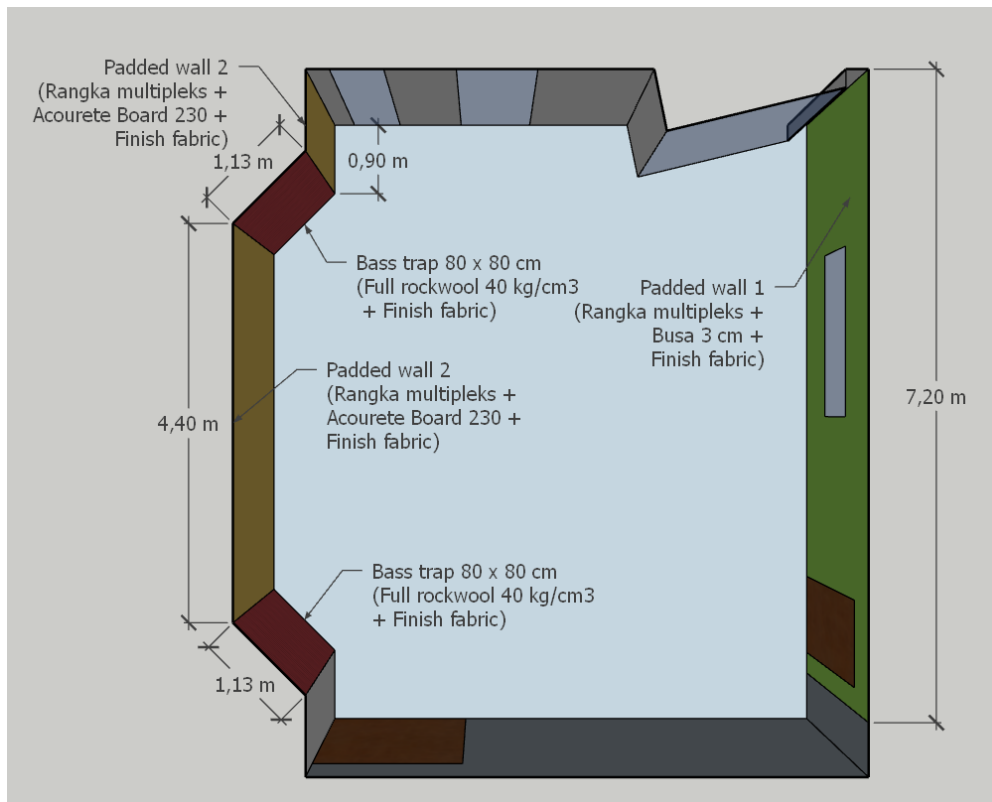
*Deviasi simulasi dan pengukuran ± 8 dB

#MENUJUSUARABAIK

Studio Musik

Rekomendasi Desain Akustik Ruang

Rekomendasi waktu dengung untuk studio musik dengan volume $\pm 157 \text{ m}^3$ adalah **0.55 detik** (Everest, F.A.; (2001, p. 153) - Recording Studios), sedangkan kondisi awal waktu dengung masih cukup tinggi (**2.2 detik**). Treatment akustik pada ruangan dilakukan dengan menggunakan kombinasi *padded wall*, *bass trap*, dan panel perforasi.



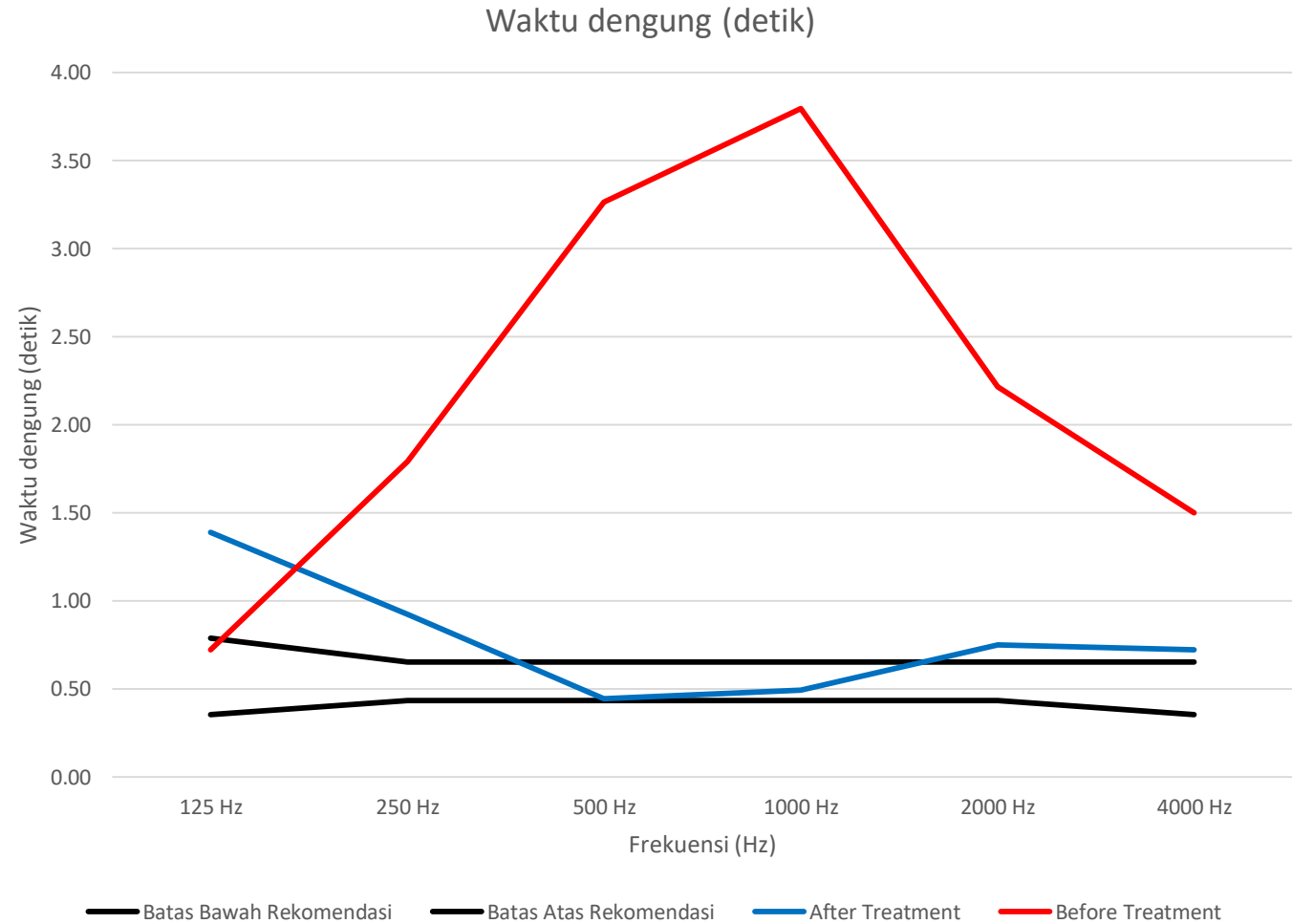
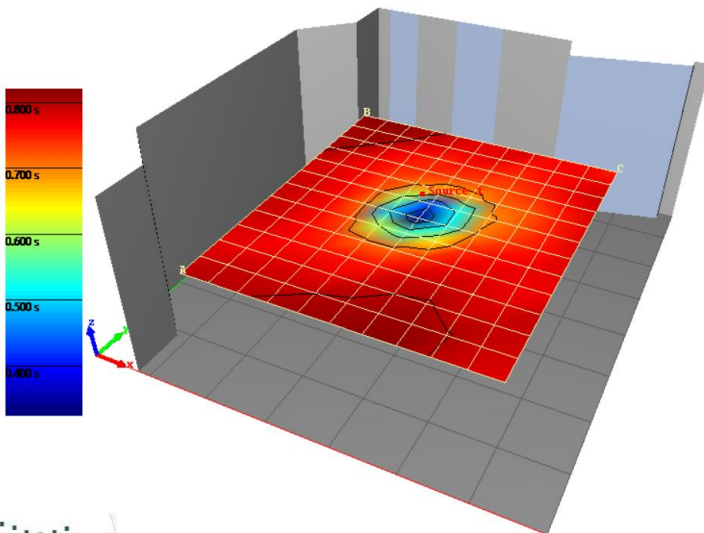
Struktur	Luasan (m ²)	Treatment Akustik
Dinding	17.4	Padded Wall 1 1. Rangka multipleks 40 mm 2. Busa 30 mm 3. Finishing fabric
Dinding	15.9	Padded Wall 2 1. Rangka multipleks 40 mm 2. Acourete board 230 3. Finishing fabric
Dinding	-	2 x Bass Trap (80 x 80 x tinggi 300 cm) 1. Rangka 80 x 80 cm ² 2. Rockwool 40 kg/m ³ 3. Kain hitam penutup 4. Finishing kayu slat
Langit-langit	52	1. Rangka 50 mm 2. Busa 30 mm 3. Jayabell R15 no.1 (dia 15 distance 30)

Studio Musik

Simulasi Waktu Dengung

Tanpa Treatment	Rekomendasi
2,2 detik	0,55 detik
	Prediksi
	0,8 detik

Mapping waktu dengung (detik) setelah treatment



Studio Musik

Konstruksi



Studio Musik

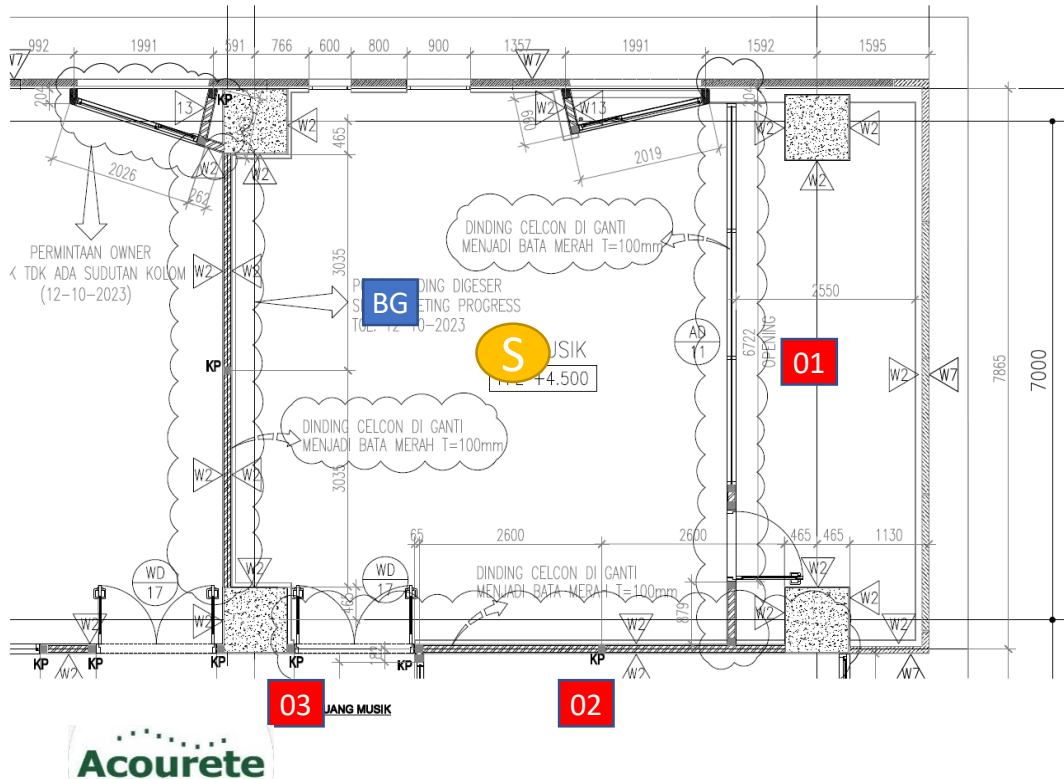
Pengukuran Terbangun
Acuan: ISO 3382-2



Studio Musik

Pengukuran Insulasi Terbangun

Pengukuran insulasi STC dilakukan dengan menggunakan speaker dengan suara *pink noise* dan alat ukur sound level meter NTI XL2. Dengan *background noise* (suara tanpa aktivitas) di dalam ruangan studio sebesar 55.2 dB dan suara sumber



Titik 01

STC Simulasi	STC Pengukuran
42	31

Titik 02

STC Simulasi	STC Pengukuran
57	31

Titik 03

STC Simulasi	STC Pengukuran
34	24

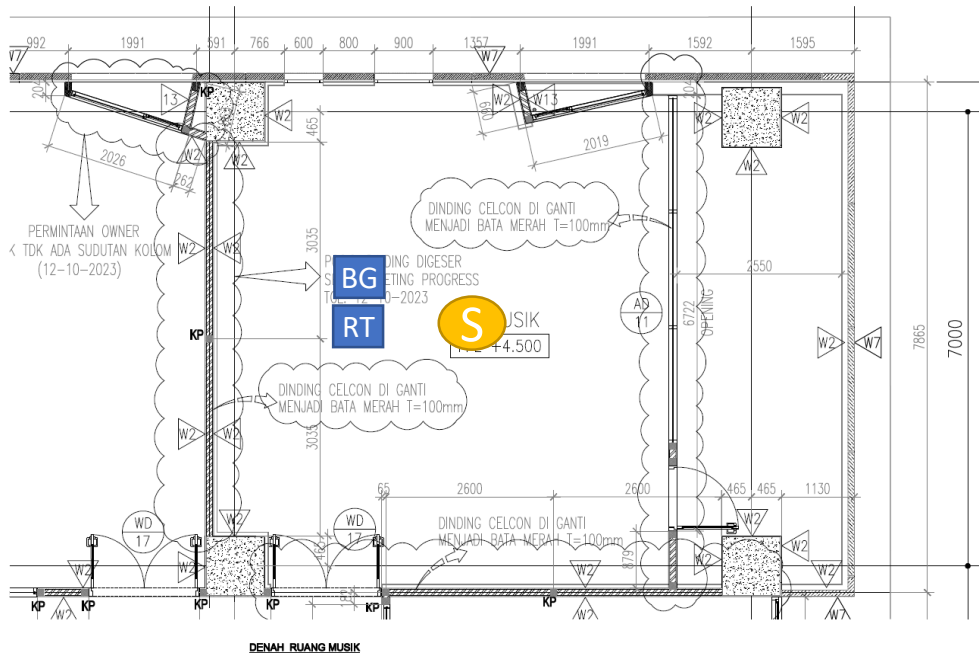
Terdapat perbedaan nilai STC simulasi dan pengukuran yang dapat terjadi akibat

1. Terdapat flanking suara melalui celah-celah pintu, meskipun sudah ditutup dengan seal karet (TITIK 01 & 03)
2. Terdapat lubang yang belum ditutup (TITIK 01)

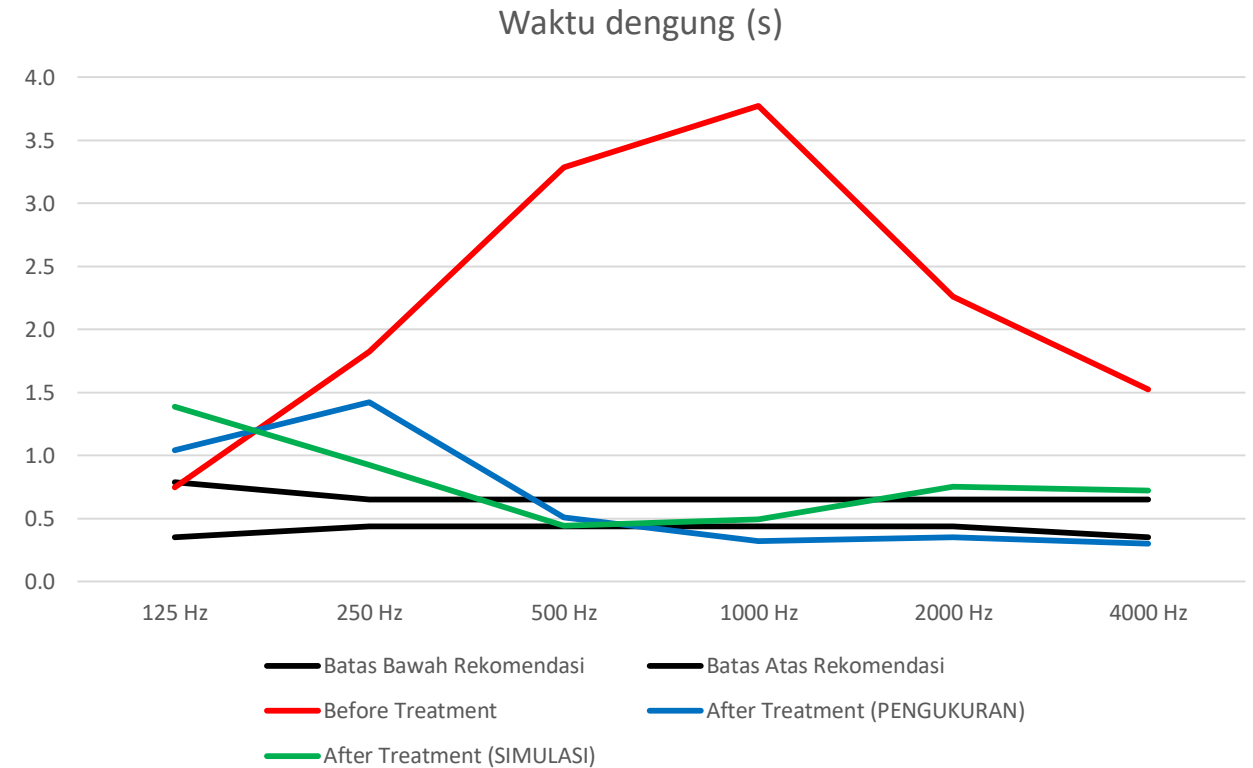
Studio Musik

Pengukuran Waktu Dengung Terbangun

Pengukuran akustik waktu dengung dilakukan dengan menggunakan speaker dengan suara *pink noise* dan alat ukur sound level meter NTI XL2. Dengan *background noise* (suara tanpa aktivitas) di dalam ruangan studio sebesar 55.2 dB



DEWAH RUANG MUSIK



Tanpa Treatment	Rekomendasi	Setelah Treatment (Simulasi)	Setelah Treatment (Pengukuran)
2,2 detik	0,55 detik	0,8 detik	0,7 detik

Studio Musik

Dokumentasi



<https://bit.ly/AGCArsitekturUNS>



Contact Us



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Noise Control



Acourete



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