İŞVEREN :

MİKODAM TASARIM SANAYİ VE TİC. A.Ş.

PROJE ADI :

AKUSTİK PANELLER

ONAY:

KONU:

AKUSTİK DEĞERLENDİRME RAPORU

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TARİH : 19 Eylül 2017	REVİZYON NO: 02
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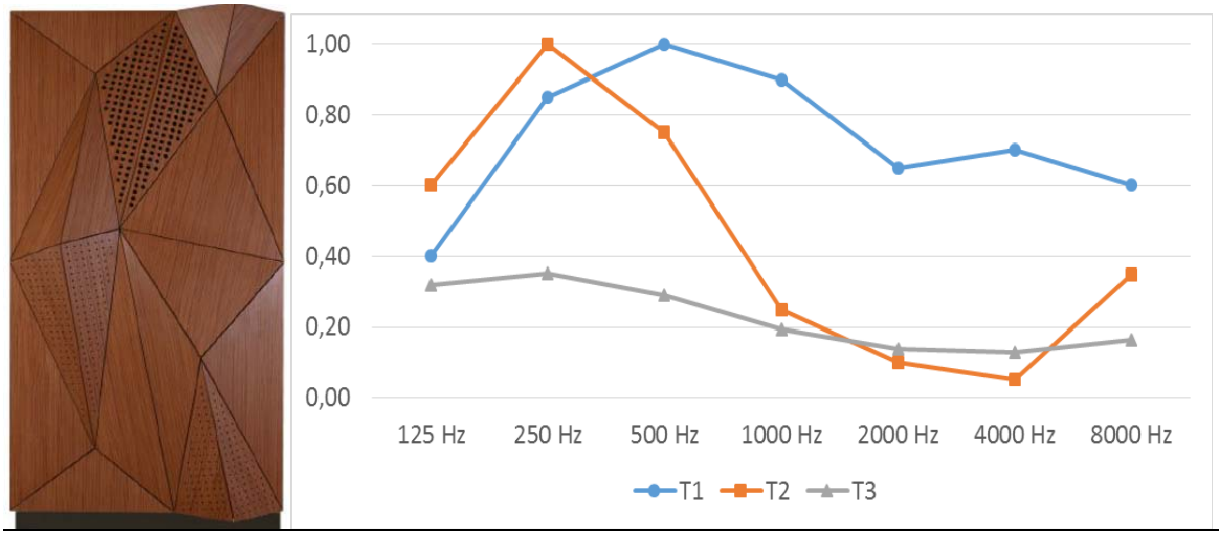
1. GETA



TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,40	0,85	1,00	0,90	0,65	0,70	0,60	0,70 (L,M)	C	0,85
T2	0,60	1,00	0,75	0,25	0,10	0,05	0,35	0,15 (L,M)	E	0,53
T3	0,32	0,35	0,29	0,19	0,14	0,13	0,17	0,20 (L)	E	0,24

T1: 20 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T2: 8 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T3: Composite module – perforated + solid (backed with 50 mm thick 50 kg/m^3 mineral wool)

Figure 1. Sound absorption coefficient graph over 1/1 octave bands of GETA panel for alternative perforations

- GETA Module provides different absorption characteristics for its alternative perforation ratios.
- T1 can be used where high absorption is necessary on wall surfaces and can function to provide optimum reverberation desired for a room.
- T2 can be used where high absorption is demanded for low frequency range, especially suited for electroacoustic sound reinforcement with music material of dominant low-frequency energy content in such rooms.
- T3 can be used for medium absorption in small rooms or in large rooms where additional absorption is necessary to provide acoustical comfort.
- Besides absorption, all types can provide effective sound scattering for the range of frequencies from 250 Hz to 2000 Hz due to variations in both depth and length of each element within the modules. This will allow even distribution of sound within the room where they applied, and will prevent acoustical defects causing disturbance due to harsh sound reflections, acoustical glare, echo or flutter echo.

Below presented results are for GETA panel application in a hotel room for scenario T3:

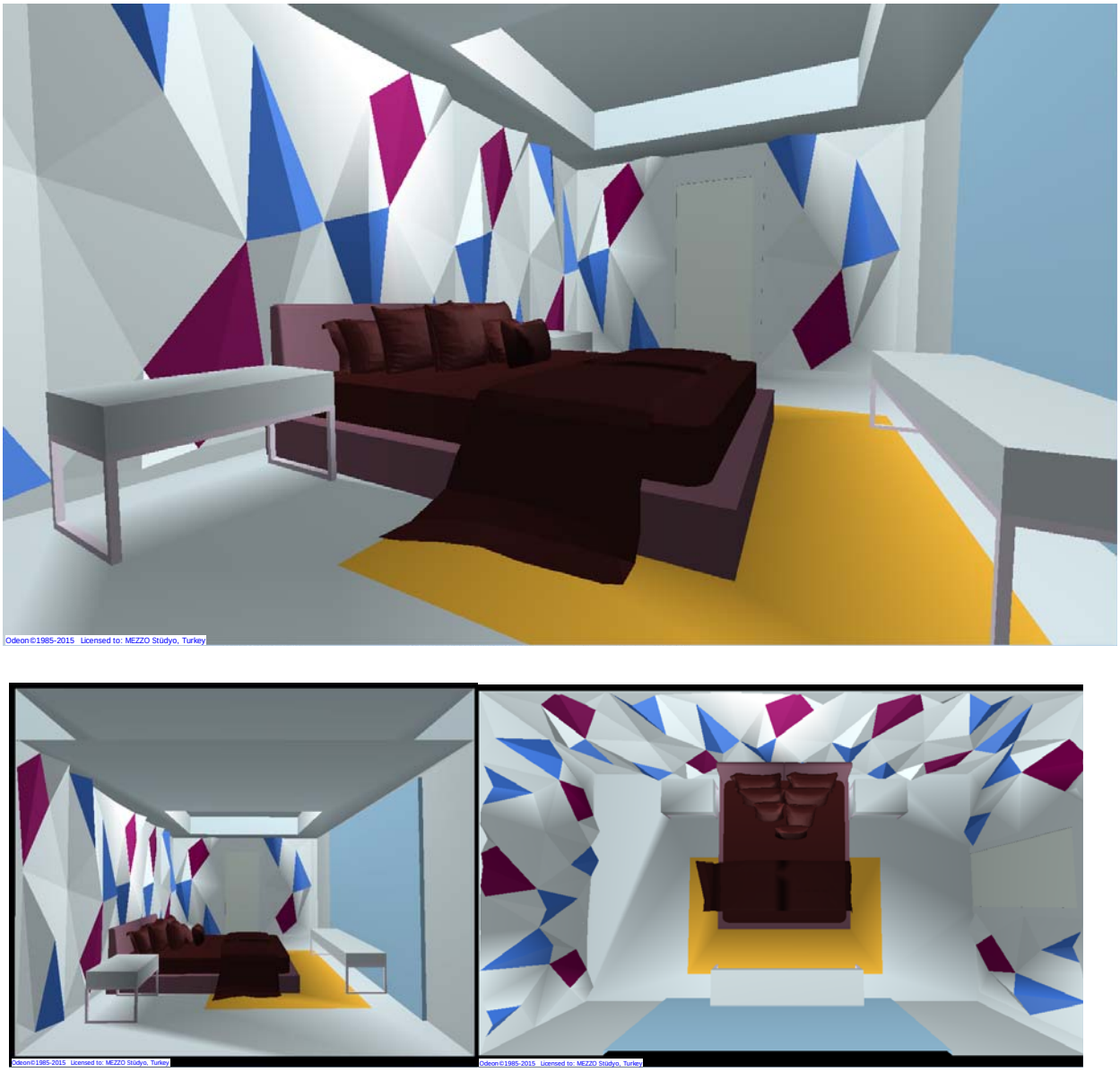


Figure 2. 3D OpenGL views of the simulation room

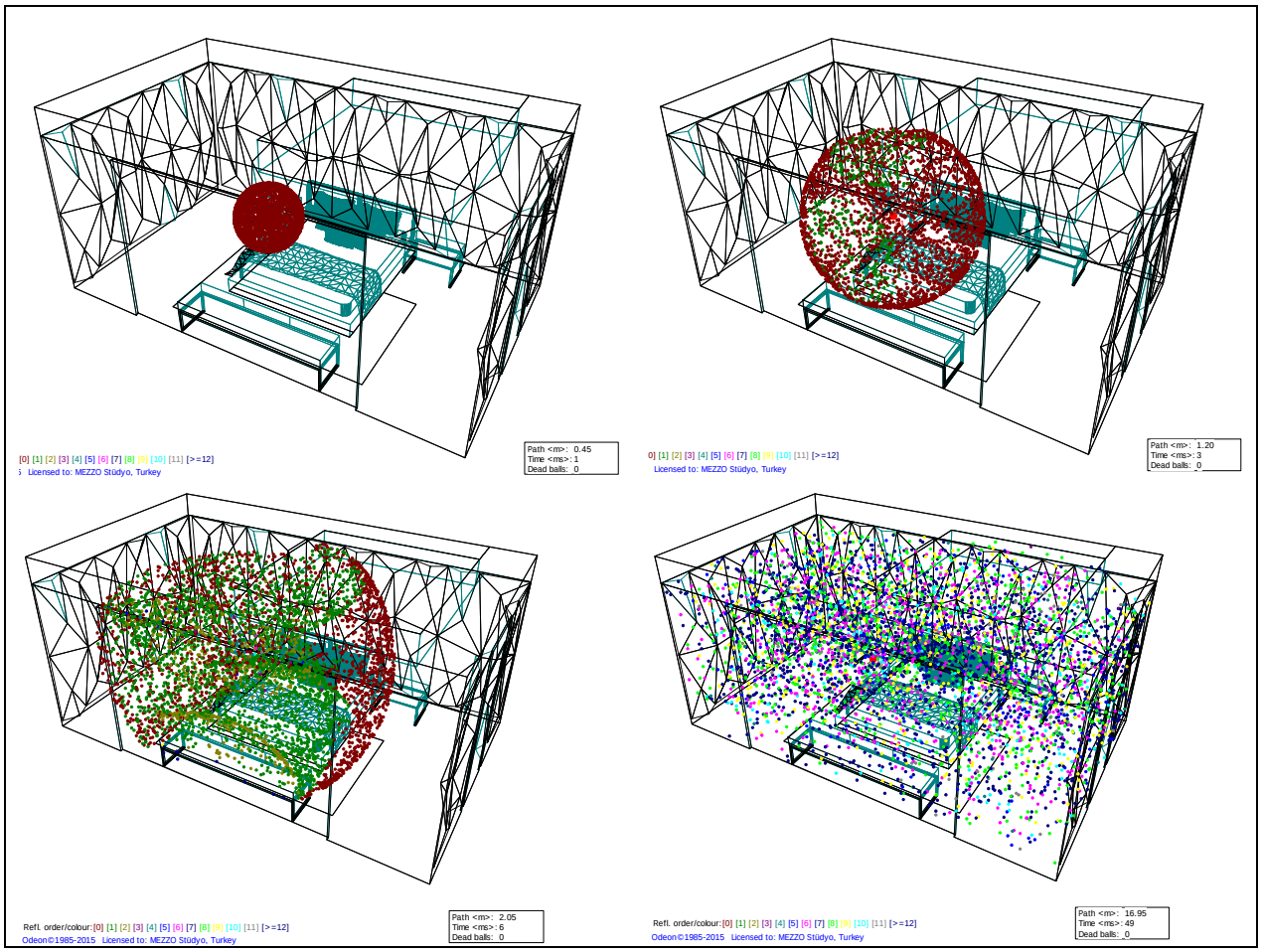


Figure 3. 3D Billard within the simulation room

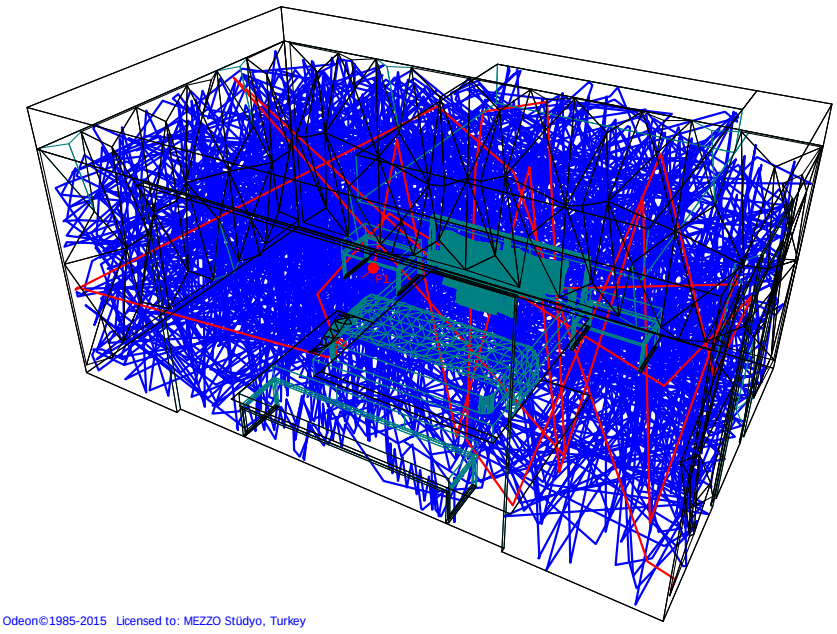


Figure 4. Ray Tracing within the simulation room

ODEON 14.01 Combined
Licensed to: MEZZO Stüdyo, Turkey
User id: 2211, dongle no:103029

Room: C:\...\ODEON\getta\GETTA_room
Geometry/Material/Source version: 4/4/1

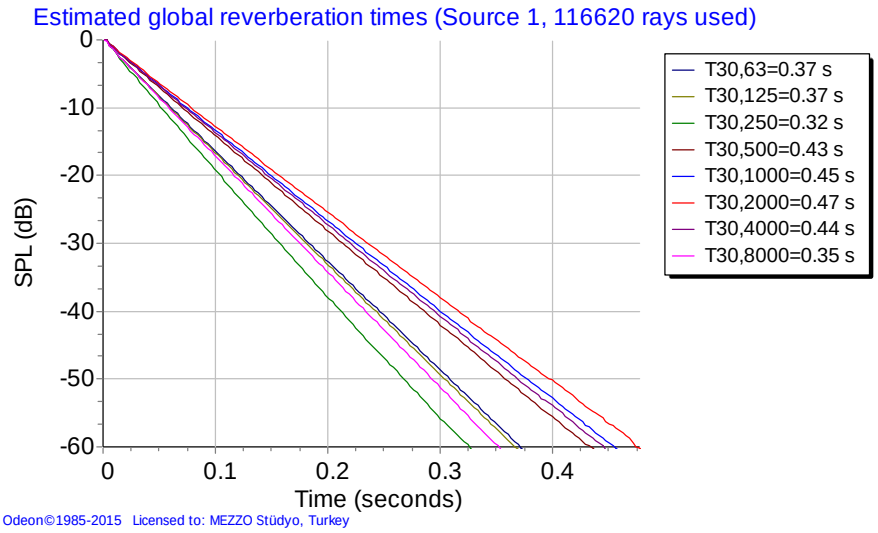


Figure 5. Estimated Global Reverberation Times Energy Decay Curves for simulation room – scenario T3

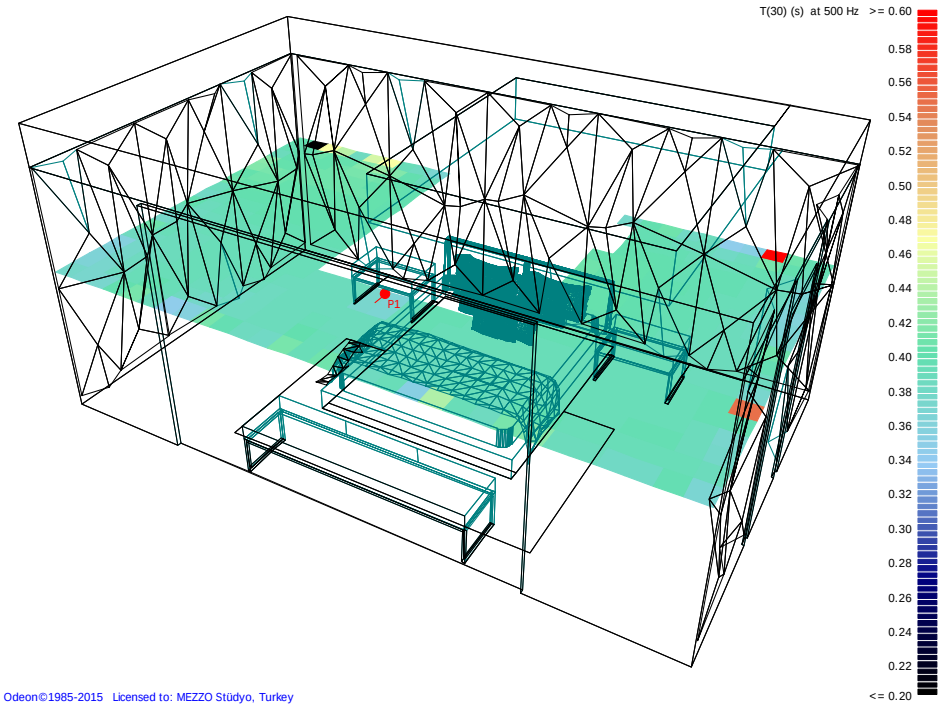


Figure 6. Reverberation Time,T30 map within simulation room at 500 Hz – scenario T3

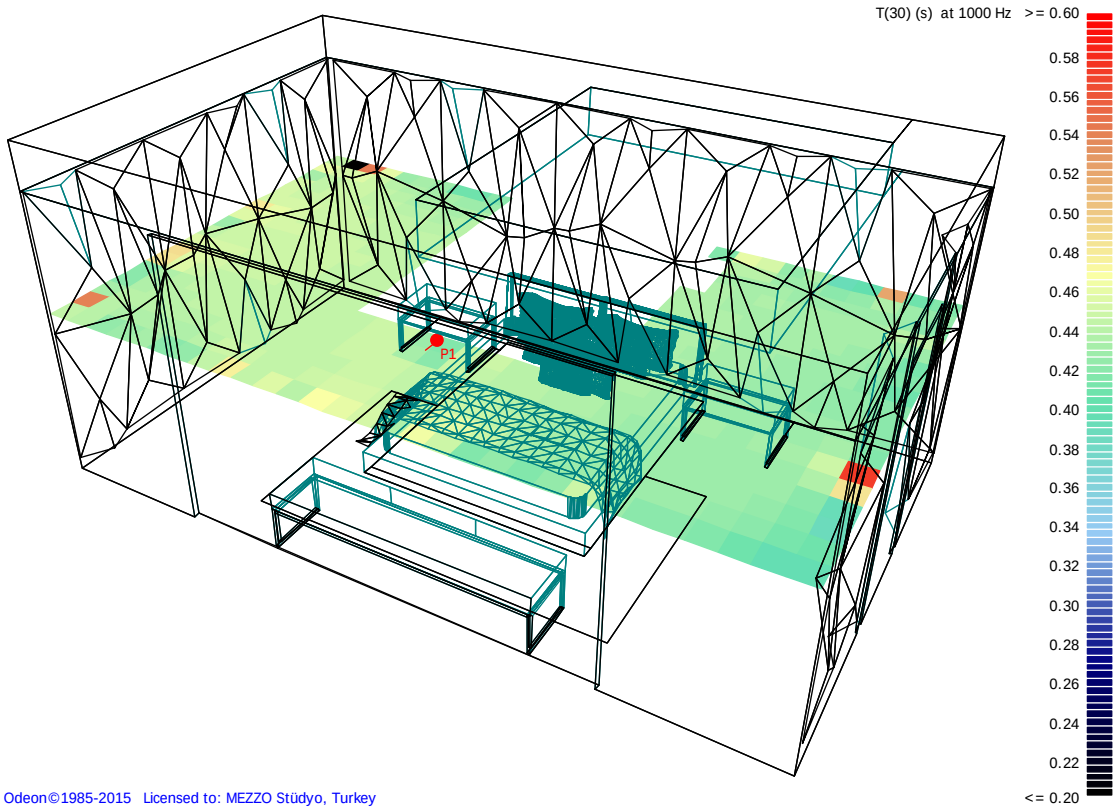
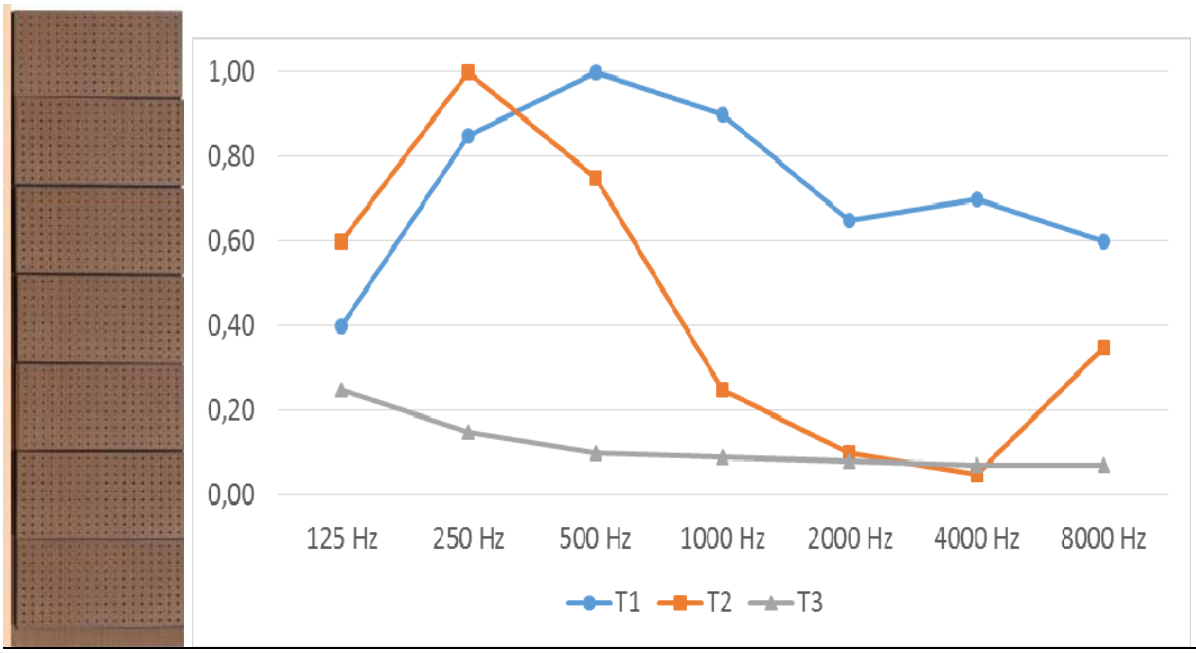


Figure 7. Reverberation Time,T30 map within simulation room at 1000 Hz – scenario T3

2. FİLA



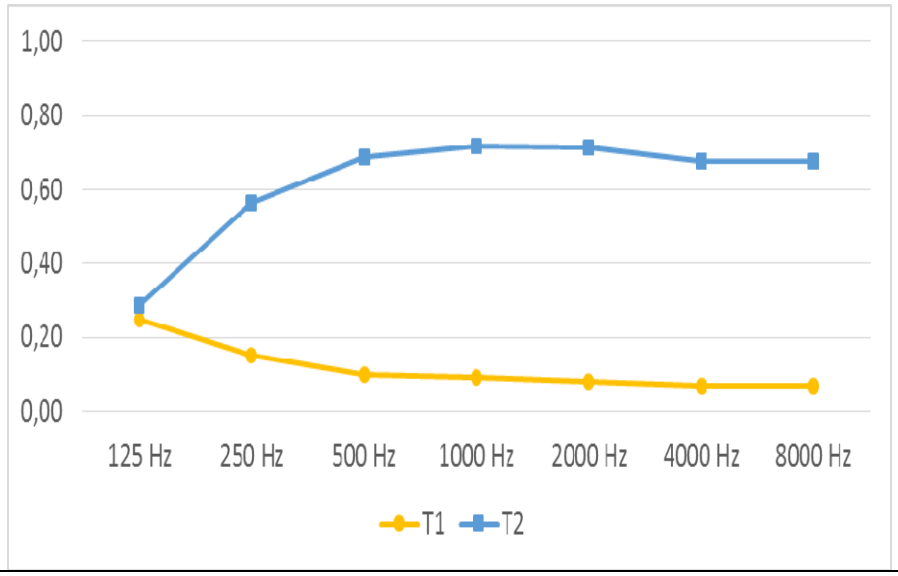
TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,40	0,85	1,00	0,90	0,65	0,70	0,60	0,70 (L,M)	C	0,85
T2	0,60	1,00	0,75	0,25	0,10	0,05	0,35	0,15 (L,M)	E	0,53
T3	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11

T1: 20 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T2: 8 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T3: Solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)

Figure 8. Sound absorption coefficient graph over 1/1 octave bands of FİLA panel for alternative perforations

- FİLA Module provides different absorption characteristics for its alternative perforation ratios.
- T1 can be used where high absorption is necessary on wall surfaces and to provide optimum reverberation desired for a room.
- T2 can be used where high absorption is demanded for low to mid frequency range, especially suited for electroacoustic sound reinforcement with music material of dominant low-frequency energy content in such rooms.
- T1, T2 and T3 can provide effective sound scattering in between a range of 500 Hz to 8000 Hz due to different sized depths/projections of each module. This will allow even distribution of sound within the room where they applied, and will prevent acoustical defects causing disturbance due to harsh sound reflections, acoustical glare, echo or flutter echo.

3. SAPA



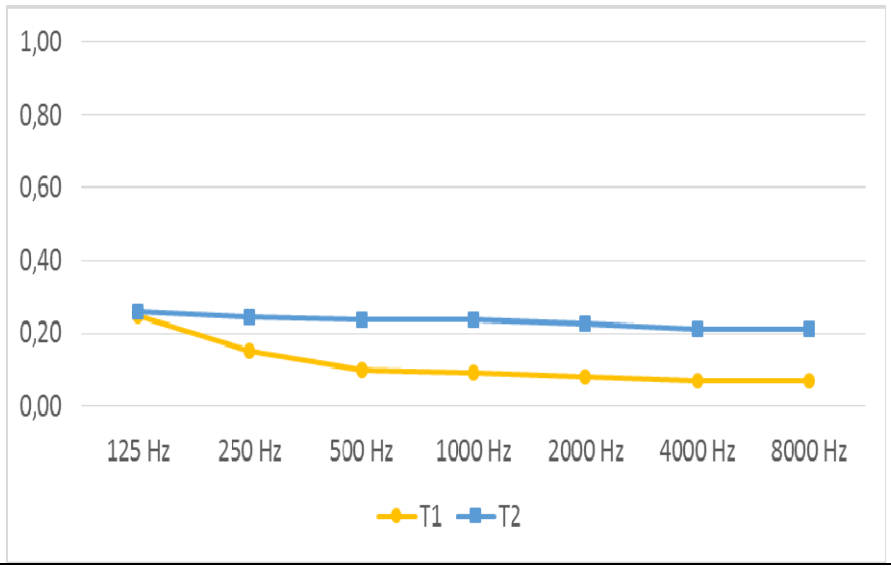
TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11
T2	0,28	0,56	0,69	0,72	0,71	0,68	0,68	0,7	C	0,67

T1: Standard solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)
T2: Composite panel of solid wood elements + fabric with 50 mm thick 50 kg/m^3 mineral wool backing

Figure 9. Sound absorption coefficient graph over 1/1 octave bands of SAPA panel for its alternative types

- SAPA Module provides different absorption characteristics for its alternative types.
- T2 can be used where high absorption is necessary on wall surfaces and to provide optimum reverberation desired for a room.
- T1 and T2 can provide effective sound scattering for the range of frequencies from 315 Hz to 8000 Hz due to variations in both depth and length of each element. This will allow even distribution of sound within the room where they applied, and will prevent acoustical defects causing disturbance due to harsh sound reflections, acoustical glare, echo or flutter echo.

4. TUSA



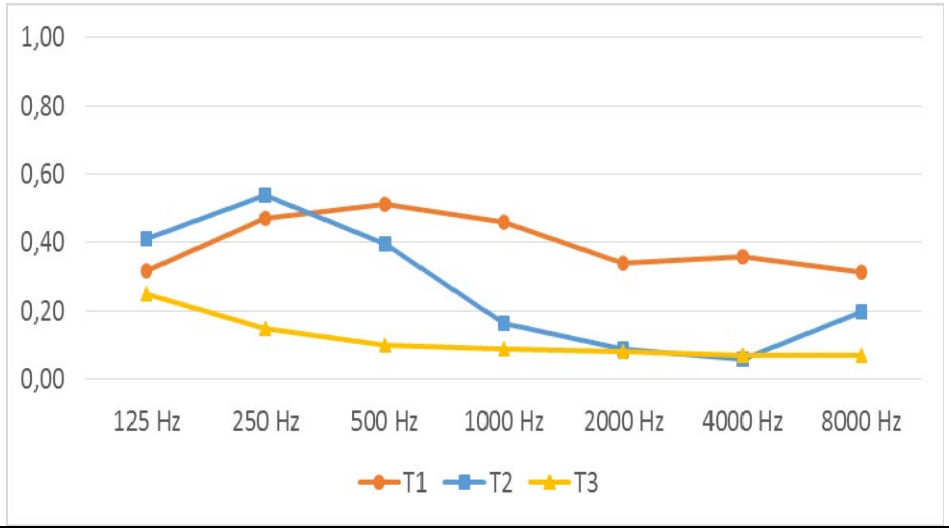
TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11
T2	0,26	0,25	0,24	0,24	0,23	0,21	0,21	0,25	E	0,24

T1: Standard solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)
T2: Composite panel of solid wood parts + fabric with 50 mm thick 50 kg/m^3 mineral wool backing

Figure 10. Sound absorption coefficient graph over 1/1 octave bands of TUSA panel for its alternative types

- TUSA Module provides different absorption characteristics for its alternative types.
- T2 can be used for light absorption in small rooms or in large rooms where additional absorption is necessary to provide acoustical comfort.
- Having different depths in elevation both T1 and T2 is more effective in sound scattering in comparison to a solid flat panel. This will be beneficial in preventing acoustical defects causing disturbance due to harsh sound reflections, acoustical glare, echo or flutter echo.

5. BİSA



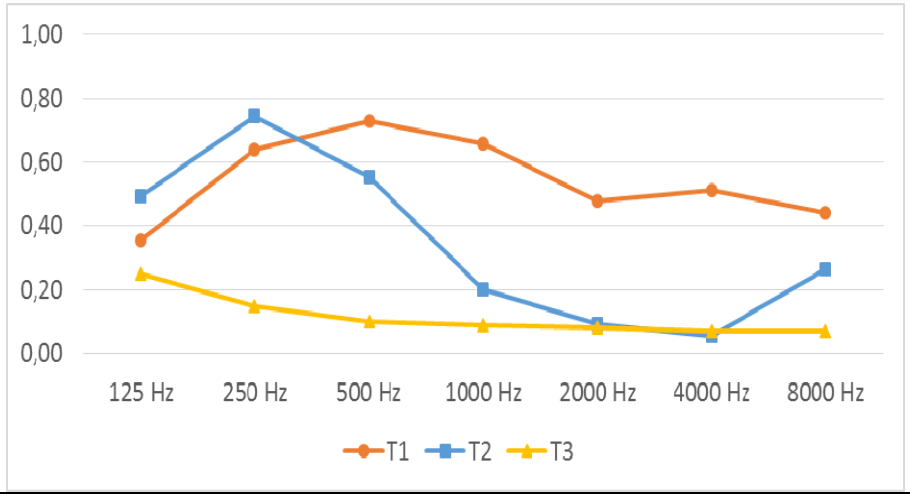
TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,32	0,47	0,51	0,46	0,34	0,36	0,31	0,40 (L)	D	0,45
T2	0,41	0,54	0,40	0,16	0,09	0,06	0,20	0,15 (L,M)	E	0,30
T3	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11

T1: 20 mm circular perforations with 32 mm interval + solid wood (backed with 50 mm thick 50 kg/m^3 mineral wool) +
T2: 8 mm circular perforations with 32 mm interval + solid wood (backed with 50 mm thick 50 kg/m^3 mineral wool)
T3: Standard solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)

Figure 81. Sound absorption coefficient graph over 1/1 octave bands of BİSA panel for alternative perforations

- BİSA Module provides different absorption characteristics for its alternative perforation ratios.
- T1 can be used where absorption is necessary on wall surfaces and to provide optimum reverberation desired for a room.
- T2 can be used where medium absorption is demanded for low frequency range, especially suited for electroacoustic sound reinforcement with music material of dominant low-frequency energy content in such rooms.

6. TOBA



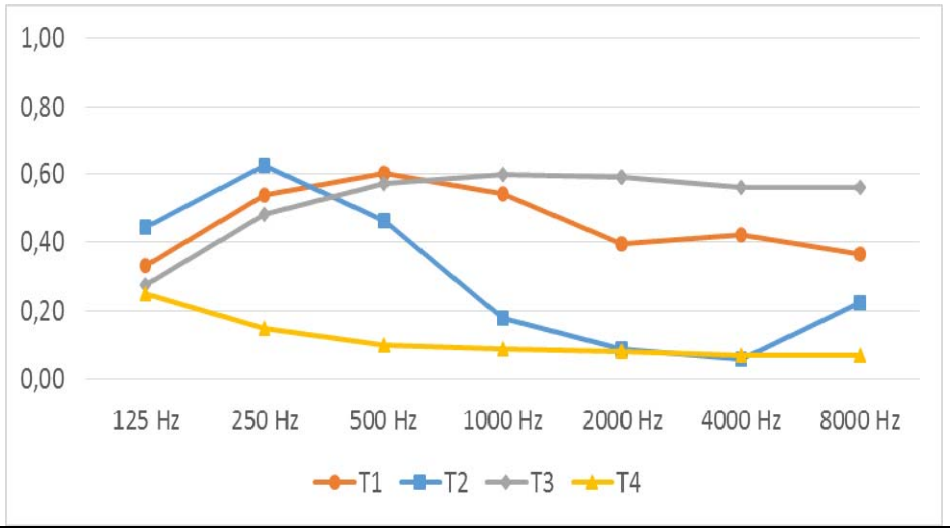
TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,35	0,64	0,73	0,66	0,48	0,51	0,44	0,55 (L)	D	0,63
T2	0,49	0,74	0,55	0,20	0,09	0,06	0,27	0,15 (L,M)	E	0,40
T3	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11

T1: 20 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T2: 8 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T3: Composite panel of solid wood parts + fabric with 50 mm thick 50 kg/m^3 mineral wool backing

Figure 92. Sound absorption coefficient graph over 1/1 octave bands of TOBA panel for alternative perforations

- TOBA Module provides different absorption characteristics for its alternative perforation ratios.
- T1 can be used where medium-to-high absorption is necessary on wall surfaces and to provide optimum reverberation desired for a room.
- T2 can be used where medium absorption is demanded for low frequency range, especially suited for electroacoustic sound reinforcement with music material of dominant low-frequency energy content in such rooms.
- Having different depths in elevation T1, T2 and T3 is more effective in sound scattering in comparison to a solid flat panel. This will be beneficial in preventing acoustical defects causing disturbance due to harsh sound reflections, acoustical glare, echo or flutter echo.

7. KOSA



TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	α_w	Class	NRC
T1	0,33	0,54	0,60	0,54	0,40	0,42	0,37	0,45 (L)	D	0,52
T2	0,44	0,62	0,46	0,18	0,09	0,06	0,23	0,15 (L,M)	E	0,34
T3	0,28	0,48	0,57	0,60	0,59	0,56	0,56	0,6	C	0,56
T4	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11

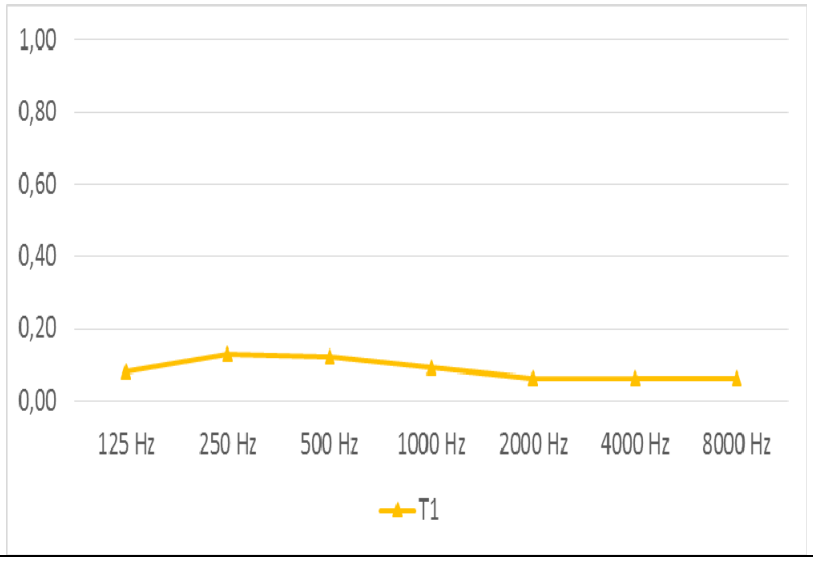
T1: 20 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T2: 8 mm circular perforations with 32 mm interval (backed with 50 mm thick 50 kg/m^3 mineral wool)
T3: Composite panel of solid wood parts + fabric with 50 mm thick 50 kg/m^3 mineral wool backing
T4: Standard solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)

Figure 103. Sound absorption coefficient graph over 1/1 octave bands of KOSA panel for alternative perforations

- KOSA Module provides different absorption characteristics for its alternative perforation ratios.
- T1 can be used where medium absorption is necessary on wall surfaces and to provide optimum reverberation desired for a room. T1 can also be used where absorption is demanded for low frequency range, especially suited for electroacoustic sound reinforcement with music material of dominant low-frequency energy content in such rooms.
- T2 can be used where medium absorption is demanded for low frequency range, especially suited for electroacoustic sound reinforcement with music material of dominant low-frequency energy content in such rooms.
- T3 can be used where medium absorption is necessary on wall surfaces and to provide optimum reverberation desired for a room.
- Having different depths in elevation T1, T2, T3 and T4 can function more effectively in sound scattering in comparison to a solid flat panel. This will be

beneficial in preventing acoustical defects causing disturbance due to harsh sound reflections, acoustical glare, echo or flutter echo.

8. HAZA



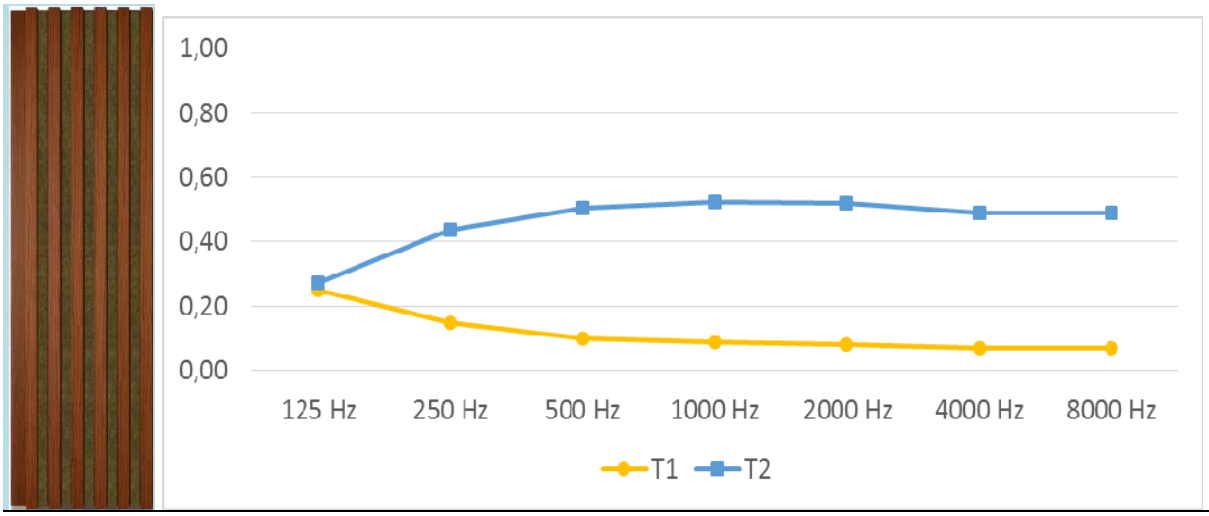
TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,08	0,13	0,12	0,09	0,06	0,06	0,06	0,10	NA	0,10

T1: Standard solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)

Figure 114. Sound absorption coefficient graph over 1/1 octave bands of HAZA panel

- The surface of HAZA panel with its convex waves is more effective in sound scattering in comparison to a solid flat panel. This will be beneficial in preventing acoustical defects causing disturbance due to harsh sound reflections, acoustical glare, echo or flutter echo.

9. KARA



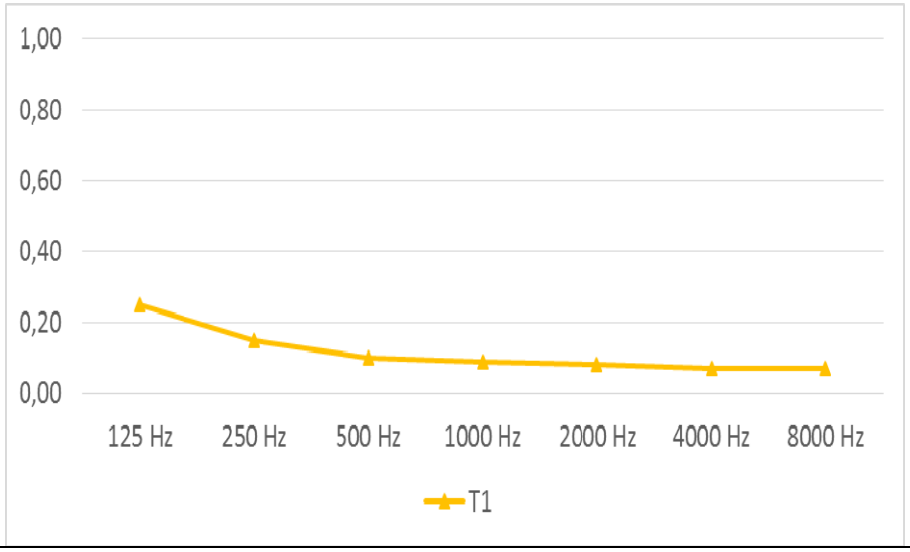
TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11
T2	0,27	0,44	0,50	0,52	0,52	0,49	0,49	0,5	D	0,50

T1: Standard solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)
T2: Composite panel of solid wood parts + fabric with 50 mm thick 50 kg/m^3 mineral wool backing

Figure 15. Sound absorption coefficient graph over 1/1 octave bands of KARA panel for its alternative types

- KARA Module provides different absorption characteristics for its alternative types.
- T2 can be used for medium absorption in small rooms or in large rooms where additional absorption is necessary to provide acoustical comfort.
- Having repetitive depths of its linear elements T1 and T2 can function as an effective sound scatterer around 6300 Hz octave band range.

10. VERO



TYPE	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	αw	Class	NRC
T1	0,25	0,15	0,10	0,09	0,08	0,07	0,07	0,1 (L)	NA	0,11

T1: Standard solid module (backed with 50 mm thick 50 kg/m^3 mineral wool)

Figure 126. Sound absorption coefficient graph over 1/1 octave bands of VERO panel

Mineral wool backing behind solid panels has also additional benefit for increasing sound insulation characteristic (STC, Rw) of the wall that the panel is applied on.