

The results of additional investigation of the noise in the apartments of the residents of 4, Uznadze Street and its neighborhood, coming from high-voltage transformers of TEC

According to the ruling of 4 February 2004 by Tbilisi Administrative District Court and the Tax Collegium, I have carried out the additional measuring works of noise parameters (sound level and sound pressure level) in the apartments of residents of 4, Uznadze street, as well as around the apartments (2 meters away from the walls). The work was conducted on 6 February 2004 (from 2pm, to 6 pm). Measuring was conducted in the apartments of the following residents:

1. Tengiz Kamushadze – in the rooms and outside of the house, 2 meters away from the wall (4, Uznadze str., I entrance, 5th floor, apart. 8);
2. Avtandil Tsulukiani – in the living room of the apartment (from the side of yard) and outside of the room, 2 meters away from the wall (4, Uznadze str., II entrance, 2nd floor, apart. 10)
3. Vano Jugeli – in the living room of the apartment (from the side of yard) and outside of the room, 2 meters away from the wall (4, Uznadze str., V entrance, 2nd floor, apart. 40)
4. Lia Alavidze – in the living room of the apartment (from the side of yard) and outside of the room, 2 meters away from the wall (4, Uznadze str., VI entrance, 2nd floor, apart. 52)
5. Giorgi Gochashvili – in the living room of the apartment (from the side of yard) and outside of the room, 2 meters away from the wall (4, Uznadze str., VI entrance, 2nd floor)
6. Otar Gureshidze - in the living room of the apartment (from the side of yard) and outside of the room, 2 meters away from the wall (4, Uznadze str., VII entrance, 1st floor)

Measuring was conducted through the “Robotron” 00023 sound level meter, which has the relevant certificate. Before and after each operation the meter was tested by using the calibration device. The measuring was carried out according to the methodology provided by the national standards (GOST-1 23 337-78[1]).

The results were compared with the admissible levels approved under “Sanitation Norms SN 2.2.4/2.1.8.000-00” [2]. The extract from this document is provided in Chart 1. If the noise at the point is of tonal nature, this normative document requires to reduce the admissible level by 5 dbA ([1], remark 4 of Chart 3).

Chart 1

The admissible norms of sound level and sound pressure octave levels for the residential rooms and around them

(extract from the sanitary norms 2.2.4/2.1.8.000-00” [2].)

#	Type of the facility	Time	Level of sound dbA
1	Residential rooms	from 7am to 11pm	40
		from 11pm to 7 am	30
2	Immediate adjacent territory	from 7am to 11pm	55
		from 11pm to 7 am	45

Note: For tonal and impulsive noise correction 5 dbA shall be applied.

As the power transformers make noise at the territory of TEC 24 hours a day, the results of measuring have been compared with the norms of both, daytime and nighttime. The measuring was conducted at night (from 2-6 am), when the disturbing factors of measuring are reduced (noise background).

The results of measuring levels of sound are presented in Chart 2.

Chart 2

#	Place of measuring	Excess over norm dbA
1	2	3
1.	Kamushadze’s apartment (I entrance, 5 th floor, apart. 8), living room with a window to the TEC site	35
1.1.	Excess in a daytime	No
1.2.	Excess at night	10

2.	Outside of Kamushadze's room, 2 meters away from the wall (to the TEC site)	51
2.1.	Excess in a daytime	1
2.2.	Excess at night	11
3.	Tsulukiani's apartment (II entrance, 2 nd floor, apart.10) living room with a window to the yard	28
3.1	Excess in a daytime	No
3.2	Excess at night	3
4.	Outside of Tsulukiani's room, 2 meters away from the wall, site to the yard	43
4.1.	Excess in a daytime	No
4.2.	Excess at night	3
1	2	3
5.	V. Jugeli's apartment (V entrance, 2 nd floor, apart.40) living room with a window to the yard	25
5.1.	Excess in a daytime	No
5.2	Excess at night	0
6.	Outside of V. Jugeli's room, 2 meters away from the wall	40
6.1.	Excess in a daytime	No
6.2.	Excess at night	0
7.	L. Alavidze's apartment (VI entrance, 1 st floor, apart.52) outside of living room (to the site of yard), 2 meters away from the wall	39
7.1.	Excess in a daytime and at night	No
8.	G. Gogichashvili's apartment (VI entrance, 2 nd floor), outside of living room (to the site of yard), 2 meters away from the wall	39
8.1.	Excess in a daytime and at night	No
9.	O. Gureshidze's apartment (VII entrance, 1 st floor), in the living room with a widow to the site of yard	24
9.1.	Excess in a daytime and at night	No
10.	Outside of Gureshidze's living room, 2 meters away from the floor	38
10.1.	Excess in a daytime and at night	No

The spectral analysis was done at the measuring points. On the basis of this analysis it was identified that the power transformers make a noise of tonal nature. According to the widely used definition "For practical purposes the tonal nature of the noise is identified through measuring within 1/3 octave lines, with no more than 10 db excess of one line with the next line" [2].

The results of the spectral analysis, which confirm existence of tonal components (at the frequency of 100 and 200 hertz) are introduced in Chart 3. Due to the tonal nature of the

measured noise, the admissible value has been reduced by 5 dbA, according to the current sanitary norms [2], i.e. correction 5 dbA has been applied.

The results of comparison of measured levels at the points with the admissible values (i.e. “excess over the norm”) are introduced in Chart 2.

Chart 3

#	Place of measuring	The level of sound pressure, db, according to average geometrical frequencies of 1/3 octave lines, hertz					
		80	100	125	160	200	250
1.	Kamushadze’s apartment with a window to the site of TEC	51	68	49	40	53	42
2.	Outside of Kamushadze’s living room, 2 meters away from the wall	36	48	38	26	37	25
3.	A. Tsulukiani’s apartment with a window to the yard				22	33	21
4.	Outside of Tsulukiani's living room, 2 meters away from the wall (from the side of the yard)	42	56	42	34	46	34

Note: The value of the level of sound pressure in the 1/3 octave lines, where the tonal components are found, are distinguished in bold and italic.

Conclusions

On the basis of the conducted activities the following has been confirmed:

1. The transformers allocated on the territory of Chugureti district make the noise, specter of which consists of the tonal components. With this respect in the [process of result assessment of the noise measuring the correction of 5 dbA has been applied.
2. In apartment 8 of Kamushadze noise of transformer exceeds the admissible level at night time by 10 dbA. Near the wall of that room, 2 meters away from the wall, the noise of transformer exceeds the norm at night hours by 11 dbA.
3. In the living room of Tsulukiani and at the outside wall of that room (from the side of yard, 2 meters away from the wall) the noise of working transformer at night hours exceeds the norm by 3 dbA.

4. In apartment 40 of Jugeli and at the outside wall of that room (from the side of yard, 2 meters away from the wall) the noise of working transformer at night hours is within the admissible norm.
5. In the apartments of L. Alavidze, G. Gochashvili and T. Gureshidze, (from the side of yard, 2 meters away from the wall) the noise of working transformer is below the admissible level.
6. In the apartment of T. Gureshidze the noise of working transformer is below the admissible level.

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