AB 207

DEPARTMENT LABORATORY OF FIRE SIGNALLING AND FIRE AUTOMATION – BA

SCIENTIFIC AND RESEARCH CENTRE FOR FIRE PROTECTION
– National Research Institute

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TESTING REPORT No. 784/BA/14, Quantity of pages 16

CUSTOMER **Name and address**	**OTC (China) International Certificate Technology Service Center LTD.** **Room 1106, Building A Fudan Science And Technology Park, No.15 ChangYi Road, 200441, Shanghai, China**
DESCRIPTION AND IDENTIFICATION OF THE PRODUCT SAMPLE INVESTIGATED	**The voice alarm loudspeakers type** **VA-565, VA-575, VA-585**
PRODUCT MANUFACTURER **Name and address**	**Manufacturer: Guangzhou ITC Electronic Technology Ltd. Room 602, 6th Floor, Aoqi Building, Luopu Street, Luoxi Xincheng, Panyu, Guangzhou, China** **Production plant: Guangzhou Baolun Electronic Co. Ltd. No.1 Building, B Zone Zhongcun Industrial, Zhongcun Street, Panyu, Guangzhou, China**

Report copy no.	**2**

Z-ca Dyrektora
ds. naukowo-badawczych

dr hab. inż. Ewa Rudnik

Józefów, October 31st, 2014

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1. TABLE OF CONTENT

Order letter of May 20th, 2014, agreement no. 784/BA/14 of May 22nd, 2014, annex to the agreement no. 784/BA/14 of August 28th, 2014.

2. SAMPLE TESTS

2.1. Name of product, type, dimensions and other markings

The voice alarm loudspeakers type VA-565, VA-575, VA-585 have the following marking labels:

Fig. 1. *The label of the loudspeaker type VA-565*

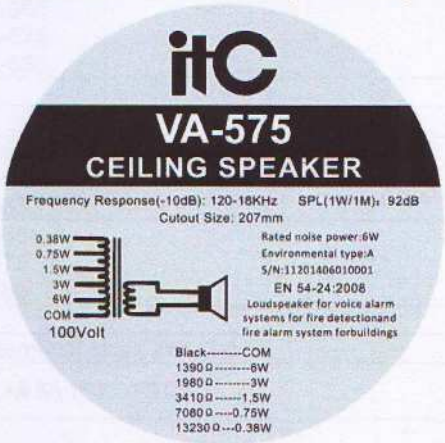


Fig. 2. *The label of the loudspeaker type VA-575*

Fig. 3. *The label of the loudspeaker type VA-585*

2.2. General technical description of the product

The parameter card of the VA-565, VA-575, VA-585 loudspeakers:

Type of information	Technical details declared by producers/customer and verified by the Laboratory
Type of loudspeaker	Ceiling
The loudspeaker has got „fire dome" enclosure (Yes/No)	Yes
Mounting method to the wall or to the ceiling	2 (two) integral locking clamps.
Type of dedicated equalizer	Not applicable
Type of transformer	SH-565-1Y - VA-565, VA-575 T-585-1Y - VA-585
Rated noise power, [W]	6 - VA-565, VA-575 15 - VA-585
Rated noise power for 100V line, transformer tapping options [W]	6/3/1,5/0,75/0,38 - VA-565, VA-575 15/7,5/3,75/1,87/0,93 - VA-585
Rated noise power for another lines, transformer tapping options [W]	For 70 [V]: 3/1,5/0,75/0,38/0,19 - VA-565, VA-575 7,5/3,75/1,87/0,93/0,46 - VA-585

Type of information	Technical details declared by producers/customer and verified by the Laboratory
Rated impedance [Ω] for each transformer tapping options	1240/1840/3340/6790/13300 - VA-565 1390/1980/3410/7080/13230 - VA-575 670/1300/2600/5300/8950 - VA-585
Loudspeaker rated impedance [Ω]	8
Sensitivity [dB]	73 - VA-565 79 - VA-575 77 - VA-585
S.P.L. (rated noise power / 4m), [dB]	86,5 - VA-565 89,5 - VA-575 91,5 - VA-585
Coverage angle 500 Hz, [°]	180
Coverage angle 1kHz, [°]	180
Coverage angle 2kHz, [°]	150 - VA-565 145 - VA-575 90 - VA-585
Coverage angle 4kHz, [°]	70 - VA-565 55 - VA-575 55 - VA-585
Range of the supply voltage [V]	70/100
Type of a terminal block (material, quantity of terminals)	Ceramic terminal block 2x3 (2 pcs)
Type of fuse (overload, thermal), range of work temperatures [°C]	Thermal, UMI 5A 150°C F3 225 R
Type of entry holes for conductors or cables	PG9
Quantity of entry holes for cables	2
Min. and max. cross-sectional of the connected conductors [mm^2]	0,8 ÷ 2,5
Working temperature, climatic category, [°C]	-10 ÷ +55
Enclosure protection degree (IP)	IP21C
Environmental type (A or B)	A
Dimensions (max. diameter x max. depth) of the loudspeaker with an enclosure [mm] (without the cable glands)	Ø180 x 125 - VA-565 Ø230 x 126 - VA-575 Ø270 x 130 - VA-585
Diameter of the diaphragm [mm]	Ø127 - VA-565 Ø166 - VA-575 Ø209 - VA-585
Dimensions of the magnetic gap (diameter x depth)	Ø70 x 16 - VA-565 Ø60 x 16 - VA-575 Ø70 x 16 - VA-585
Weight [kg]	1,35 - VA-565 1,55 - VA-575 2,10 - VA-585
Colour	Front - white, "fire dome" - red
Enclosure material (e.g.: ABS, steel- type and sign)	The shell is 0.8MM cold plate.
Mark(s) and code(s) (for example, a serial number or batch code), by which the manufacturer can identify at least, the date or batch. Where any marking on the device uses symbols or abbreviations not in common use then these shall be explained.	Eg.11201406010001 where: 11 is company code, 2014 is year, 06 is month, 01 is day, 0001 is the quantity

VIEW OF INVESTIGATED PRODUCT

Fig. 4 The front view of the loudspeaker type VA-565, VA-575, VA-585 (from left)

Fig. 5 The rear view of the loudspeaker type VA-565, VA-575, VA-585 (from left)

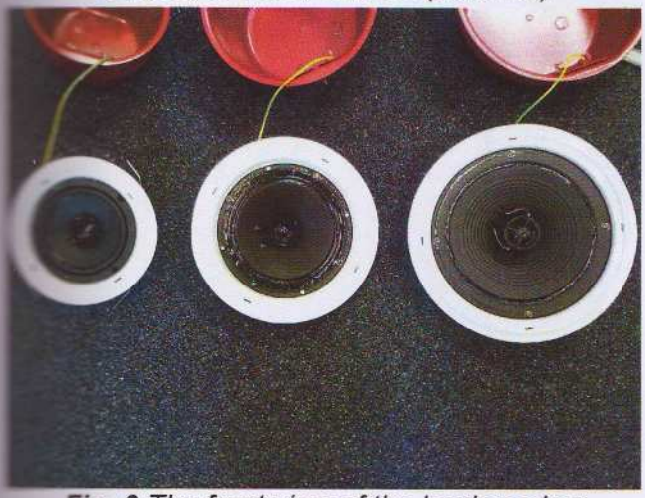


Fig. 6 The front view of the loudspeaker typeVA-565, VA-575, VA-585 without the cover (from left)

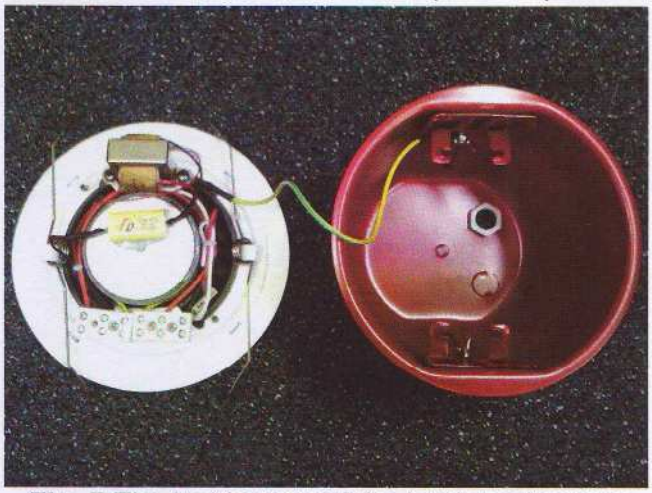


Fig. 7 The inside view of the loudspeaker type VA-565

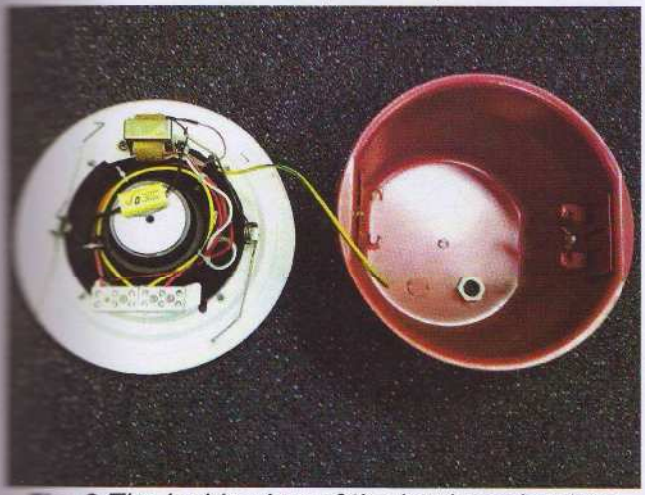


Fig. 8 The inside view of the loudspeaker type VA-575

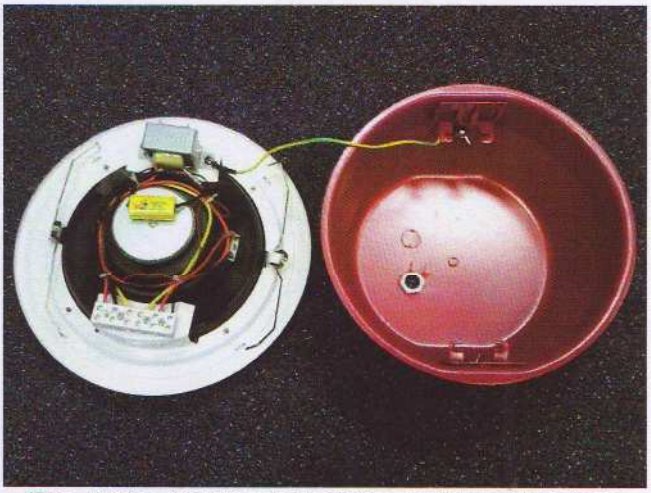


Fig. 9 The inside view of the loudspeaker type VA-585

Fig. 10 The view of the transformer type -565-1Y used in VA-565, VA-575 loudspeakers

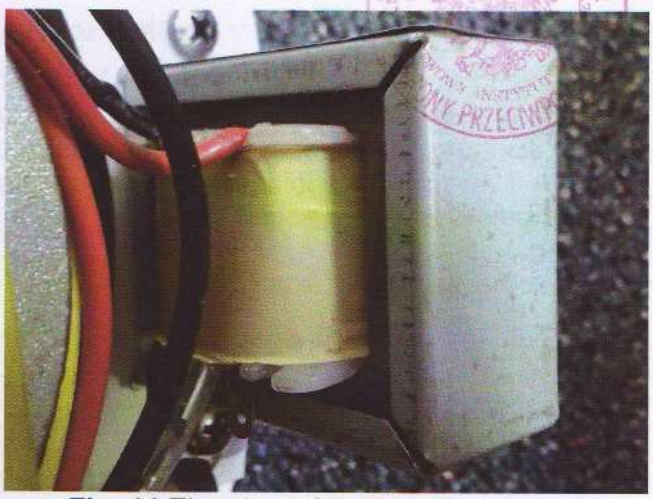


***Fig. 11** The view of the transformer type T-585-1Y used in VA-585 loudspeaker*

Fig. 12 The view of the capacitor type MT250V 3,3µF used in VA-565, VA-575

***Fig. 13** The view of the capacitor type MT250V 6,8µF used in VA-585*

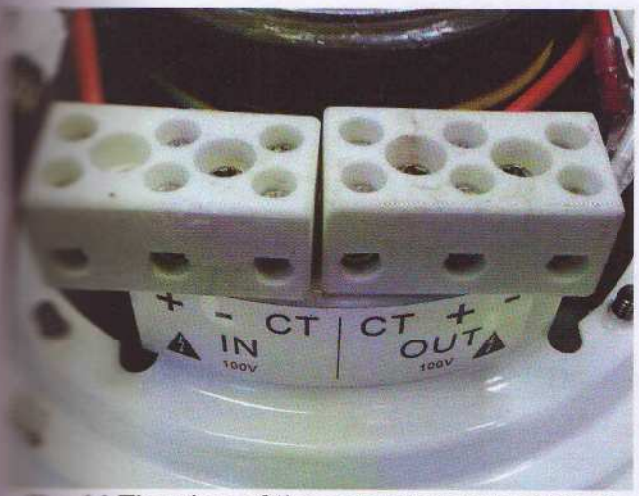


Fig. 14 The view of the ceramic terminal block

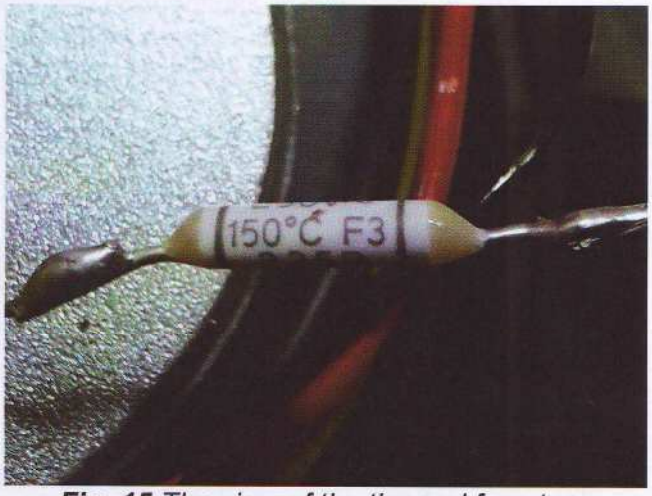


***Fig. 15** The view of the thermal fuse type UMI 5A 150°C F3 225 R*

Note: The colours on the pictures can be different than in reality.

2.3. Procedure of accepting and storing sample for testing

The customer provided for the examination samples of the products from current production. The samples underwent the routine quality control at the manufacturer. Products were delivered by the manufacturer in a transport container from the factory. The samples of products were kept in an allocated magazine, in a room temperature and normal humidity.
The loudspeakers type VA-565 (8 pcs.), VA-575 (3 pcs.), VA-585 (5 pcs.) were delivered to the laboratory on July 7th, 2014.
The loudspeakers type VA-565 (3 pcs.), VA-575 (3 pcs.), VA-585 (5 pcs.) were delivered to the laboratory on October 23rd, 2014.

The list of documentation that identifies the product:

Description	Name	Date
The technical documentation of the voice alarm loudspeakers type **VA-565, VA-575, VA-585**	1. Parameter card 2. Frequency response 3. Coverage angles 4. Installation manual 5. Constructional drawings of the loudspeakers 6. Technical specification of the transformer 7. Wiring diagram	31.10.2014

3. INVESTIGATION AND TESTING METHODS

3.1. Testing methods

The tests were conducted with the following standards:

PN-EN 54-24:2008	Fire detection and fire alarm systems – Part 24: Components of voice alarm systems – Loudspeakers
PN-EN 60068-2-1:2009	Environmental testing – Part 2-1: Tests. Test A: Cold
PN-EN 60068-2-2:2009	Environmental testing - Part 2: Tests. Tests B: Dry heat
PN-EN 60068-2-6:2008	Environmental testing – Part 2-6: Tests. Test Fc: Vibration (sinusoidal)
PN-EN 60068-2-30:2008	Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)
PN-EN 60068-2-42:2004	Environmental testing - Part 2-42: Tests - Test Kc: Sulphur dioxide test for contacts and connections
PN-EN 60068-2-75:2000	Environmental testing – Test methods – Test Eh: Hammer tests
PN-EN 60068-2-78:2007	Environmental testing – Test methods – Test Cab. Damp heat, steady state
PN-EN 60529:2003	Specification for degrees of protection provided by enclosures (IP code)

Standard without the scope of accreditation:

PN-EN 60068-2-27:2009	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock

The test program:

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008
1.	Requirements	p. 4
2.	Reproducibility (frequency response/sensitivity)	p. 5.2
3.	Rated impedance	p. 5.3
4.	Horizontal and vertical coverage angles	p. 5.4
5.	Maximum sound pressure level	p. 5.5
6.	Rated noise power – durability	p. 5.6
7.	Dry heat (operational)	p. 5.7
8.	Cold (operational)	p. 5.9
9.	Damp heat, cyclic (operational)	p. 5.10
10.	Damp heat, steady state (endurance)	p. 5.11
11.	SO_2 – corrosion (endurance)	p. 5.13

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008
12.	Shock (operational)	p. 5.14
13.	Impact (operational)	p. 5.15
14.	Vibration sinusoidal (operational)	p. 5.16
15.	Vibration sinusoidal (endurance)	p. 5.17
16.	Enclosure protection	p. 5.18

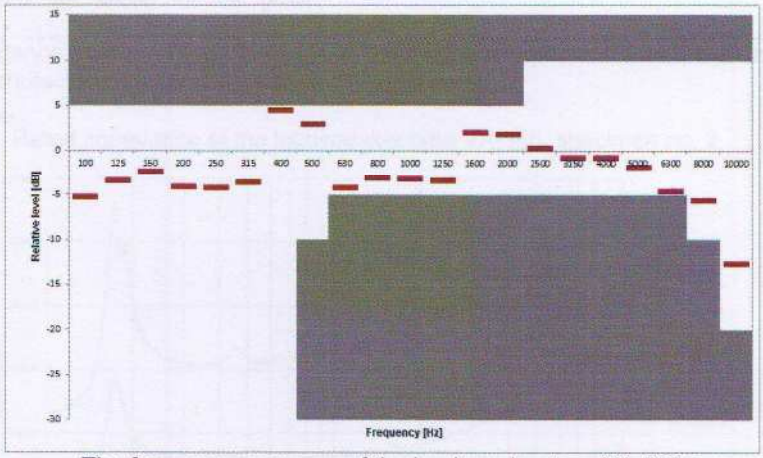
3.2. Date of testing

Tests commenced on July 7th, 2014, and ended on October 31st, 2014.

4. TEST RESULTS

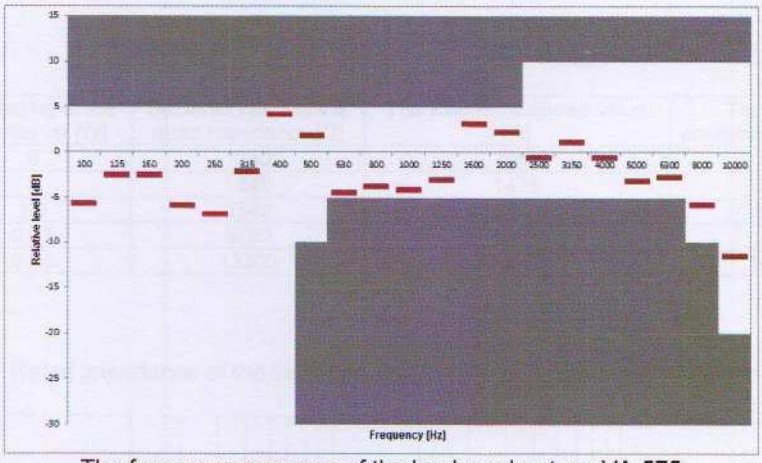
Tests accreditated by PCA (Polish Centre for Accreditation):

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result
1.	Frequency response limits	p. 4.2	positive
	The loudspeaker frequency response fits within the borders described in point 4.2 of EN 54-24:2008. More information in point 2 of this table.		
	Durability	p. 4.3	positive
	The loudspeakers type VA-565, VA-575, VA-585 are meet requirements of this point. More info in point 6 of this table.		
	Provision for external conductors	p. 4.4.1	positive
	The loudspeakers have a ceramic connection terminals mounted inside the loudspeaker cabinet. Cables are clamped between metal surfaces without being damaged.		
	Materials	p. 4.4.2	not aplicable
	The loudspeakers are made from steel.		
	Enclosure protection Type A: IP21C	p. 4.4.3	positive
	The degree of protection provided by the enclosure is IP21C. More info in point 15 of this table.		
	Access	p. 4.4.4	positive
	Means are provided to limit access to the loudspeaker for people without special tools.		
	Marking	p. 4.5.1	positive
	The loudspeakers are marked according requirements of point 4.5.1 of EN 54-24:2008.		
	Information in the product data sheet	p. 4.5.2	positive
	The manufacturer has delivered all required documentation.		
2.	Reproducibility (frequency response/sensitivity)	p. 5.2	positive
	The frequency response curve fits within the limits shown in 4.2 of EN 54-24:2008. The sound pressure levels in the 1/3 octave bands with center frequencies from 500Hz to 4kHz are within ±4dB of the manufacturer's specified curves. The sensitivity is greater than the values specified by the manufacturer.		

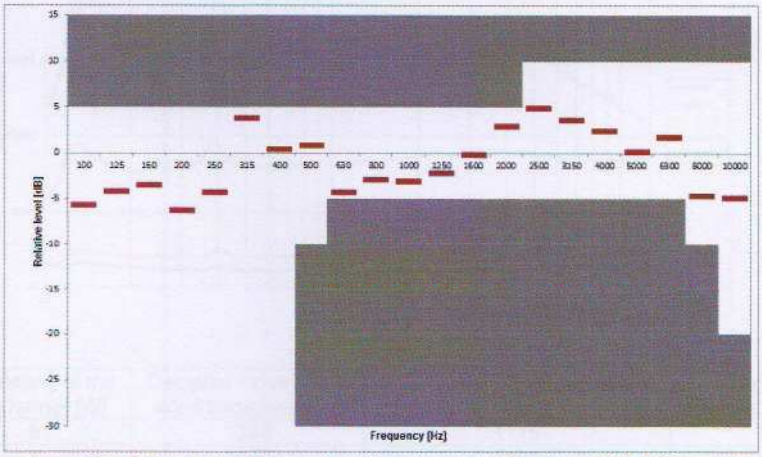


The frequency response of the loudspeaker type VA-565

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result



The frequency response of the loudspeaker type VA-575

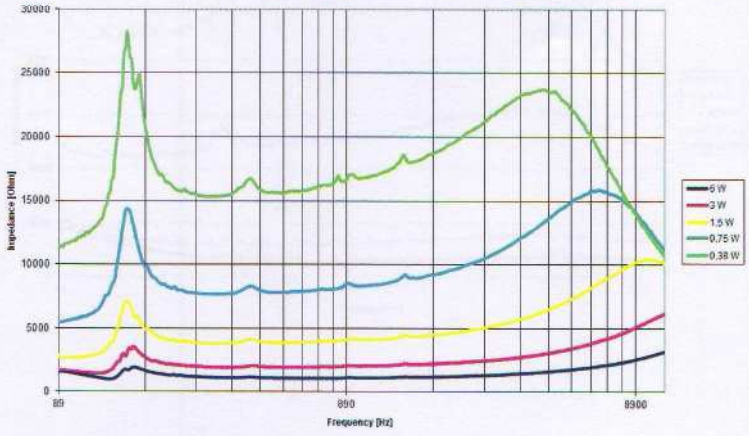


The frequency response of the loudspeaker type VA-585

3.	Rated impedance *The lowest impedance modulus given by the ratio of the RMS voltage to the RMS current, over the full frequency range from 89Hz to 11,2 kHz is not lower than 0,8 of the rated impedance specified by the manufacturer for each tap setting for the given frequency range.*	p. 5.3	positive

The value of impedance over the range from 89Hz to 11,2kHz is not lower than 0.8 of the rated impedance specified by the manufacturer for each tap setting.

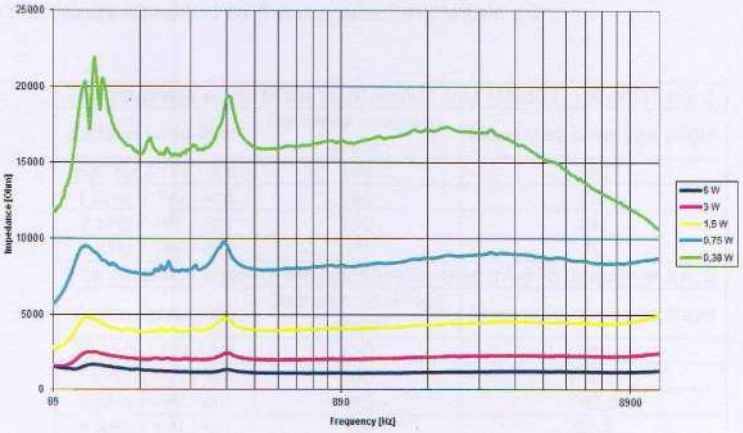
Rated impedance of the loudspeaker type VA-565, specimen no. 2



No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result

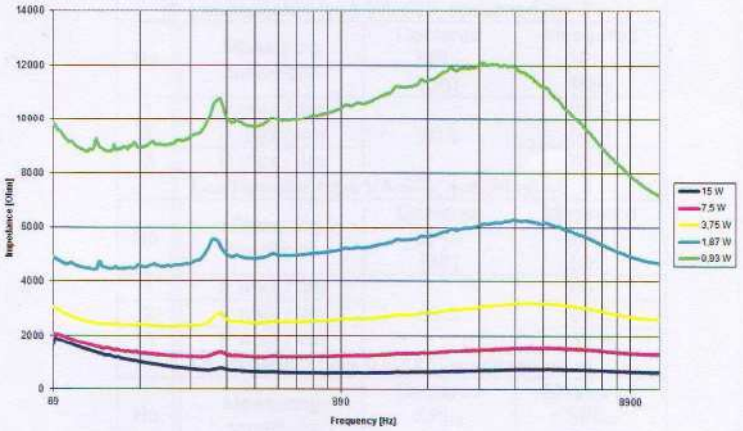
No.	Tap setting of the transformer [W]	Declared value of the rated impedance [Ω]	The lowest measured value [Ω]	The lowest acceptable value [Ω]
1.	6	1240	994	992
2.	3	1840	1475	1472
3.	1,5	3340	2676	2672
4.	0,75	6790	5436	5432
5.	0,38	13300	10645	10640

Rated impedance of the loudspeaker type VA-575, specimen no. 5



No.	Tap setting of the transformer [W]	Declared value of the rated impedance [Ω]	The lowest measured value [Ω]	The lowest acceptable value [Ω]
1.	6	1390	1115	1112
2.	3	1980	1588	1584
3.	1,5	3410	2729	2728
4.	0,75	7080	5671	5664
5.	0,38	13230	10584	10584

Rated impedance of the loudspeaker type VA-585, specimen no. 8



No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result

No.	Tap setting of the transformer [W]	Declared value of the rated impedance [Ω]	The lowest measured value [Ω]	The lowest acceptable value [Ω]
1.	15	670	622	536
2.	7,5	1300	1224	1040
3.	3,75	2600	2347	2080
4.	1,87	5300	4451	4240
5.	0,93	8950	7160	7160

4.	Horizontal and vertical coverage angles *Octave band filters centered on 500 Hz, 1kHz, 2 kHz, 4 kHz; rotate until the sound pressure level is -6dB from that recorded on the reference axis, the results shall be equal to the values specified by the manufacturer within ± 5°.*	p. 5.4	positive

The measured values of the coverage angles for octave band filters centred on 500 Hz, 1 kHz, 2 kHz and 4 kHz are equal to the values specified by the manufacturer within ±5°.

The coverage angle of the loudspeaker type VA-565, specimen no. 2		
Octave band filter	Declared coverage angle	Measured coverage angle
500 Hz / 1W / 4m	180	180
1 kHz / 1W / 4m	180	175
2 kHz / 1W / 4m	150	145
4 kHz / 1W / 4m	70	70
The coverage angle of the loudspeaker type VA-575, specimen no. 5		
Octave band filter	Declared coverage angle	Measured coverage angle
500 Hz / 1W / 4m	180	180
1 kHz / 1W / 4m	180	175,5
2 kHz / 1W / 4m	145	142,5
4 kHz / 1W / 4m	55	52,5
The coverage angle of the loudspeaker type VA-585, specimen no. 8		
Octave band filter	Declared coverage angle	Measured coverage angle
500 Hz / 1W / 4m	180	180
1 kHz / 1W / 4m	180	177,5
2 kHz / 1W / 4m	90	87,5
4 kHz / 1W / 4m	55	55

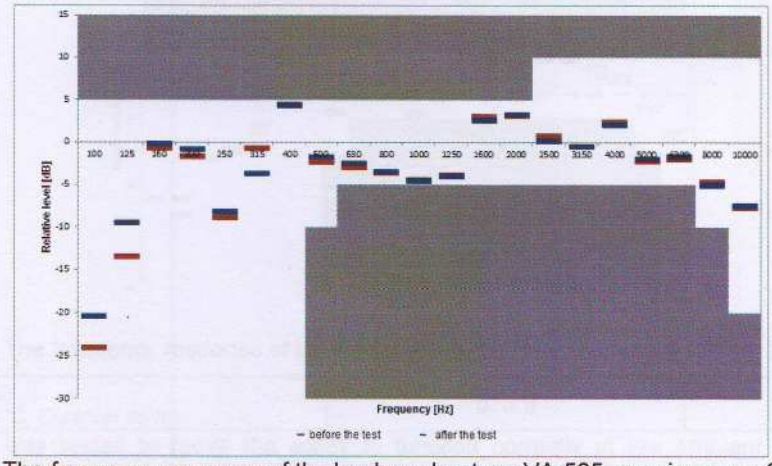
5.	Maximum sound pressure level *Rated noise voltage, measurement distance: 4m, the results shall be equal or higher than specified by the manufacturer.*	p. 5.5	positive

The measured value of SPL is equal or greater than specified by the manufacturer.

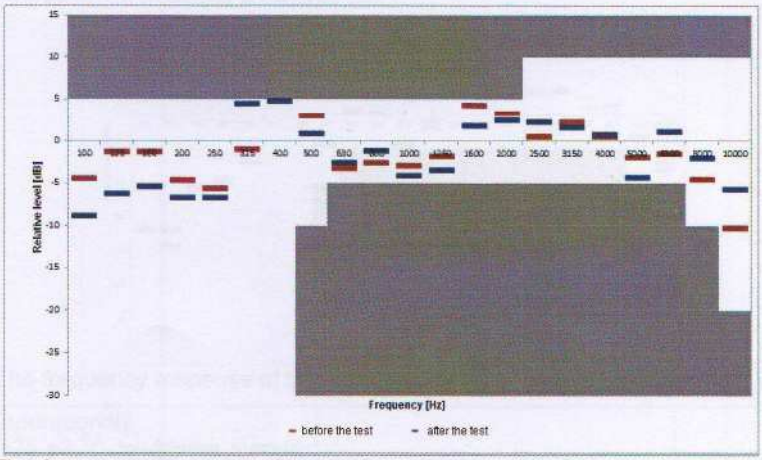
Loudspeaker type VA-565, specimen no. 2			
No.	Measuring conditions	Declared SPL_D [dB]	Measured SPL_M [dB]
1	P max / 4m	86,5	86,9
2	P max / 4m		86,9
3	P max / 4m		86,6
Loudspeaker type VA-575, specimen no. 5			
No.	Measuring conditions	Declared SPL_D [dB]	Measured SPL_M [dB]
1	P max / 4m	89,5	89,7
2	P max / 4m		89,6
3	P max / 4m		89,9
Loudspeaker type VA-585, specimen no. 8			
No.	Measuring conditions	Declared SPL_D [dB]	Measured SPL_M [dB]
1	P max / 4m	91,5	91,9
2	P max / 4m		92,0
3	P max / 4m		91,7

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result
6.	Rated noise power – durability *100 h of sounding at the rated noise voltage*	p. 5.6	positive

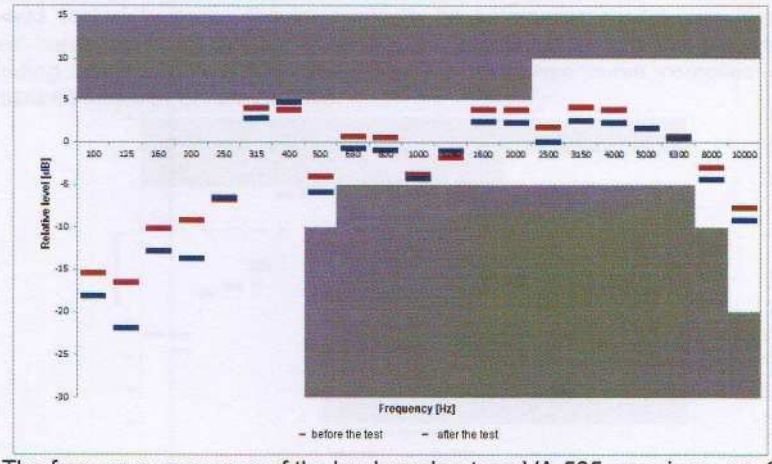
The loudspeakers were tested to check that the rated noise power specified by the manufacturer is achieved. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008. The lowest impedance value is not lower than 0,8 of the rated impedance specified by the manufacturer.



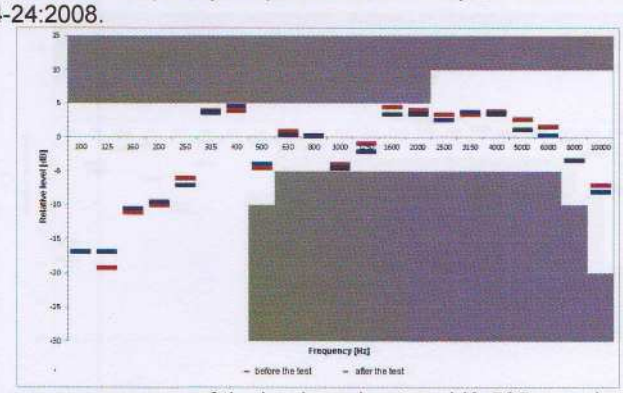
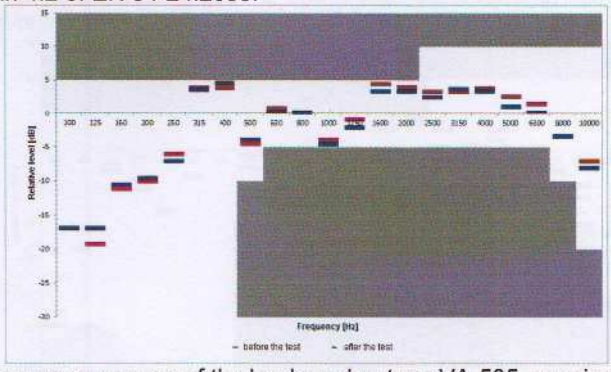
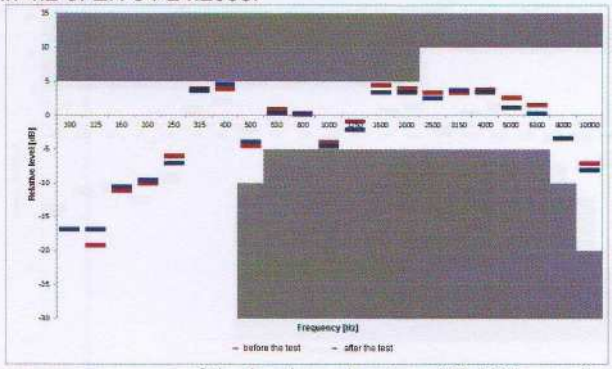
The frequency response of the loudspeaker type VA-565, specimen no. 2

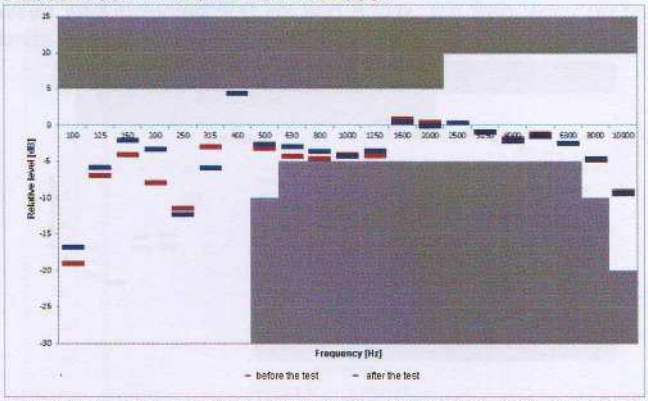
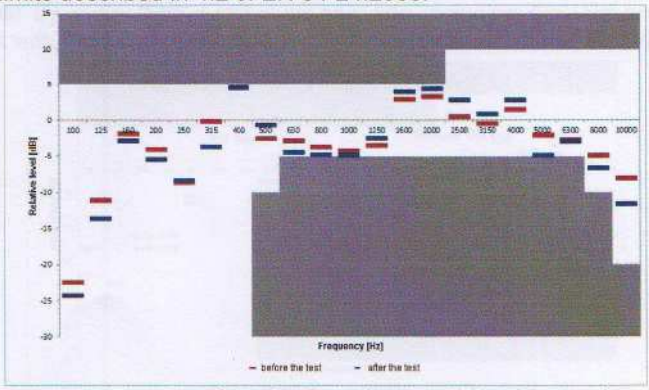
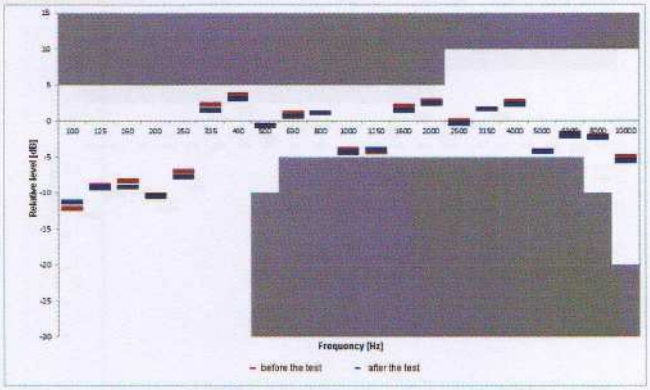


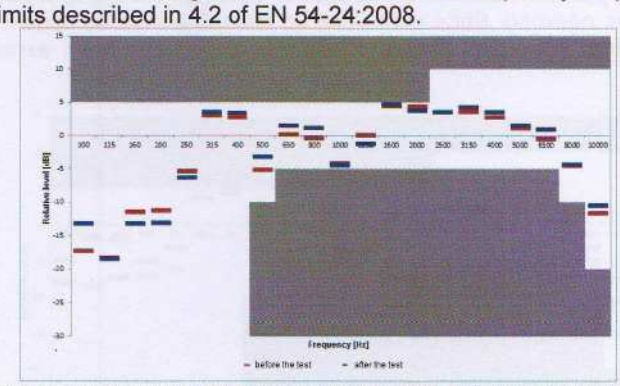
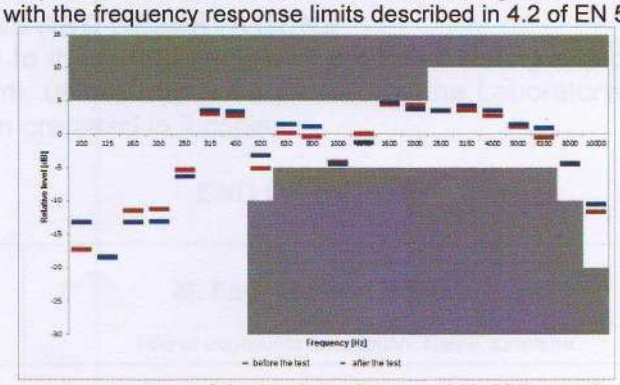
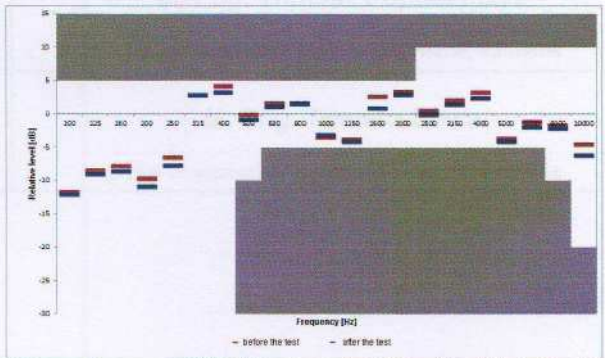
The frequency response of the loudspeaker type VA-575, specimen no. 5



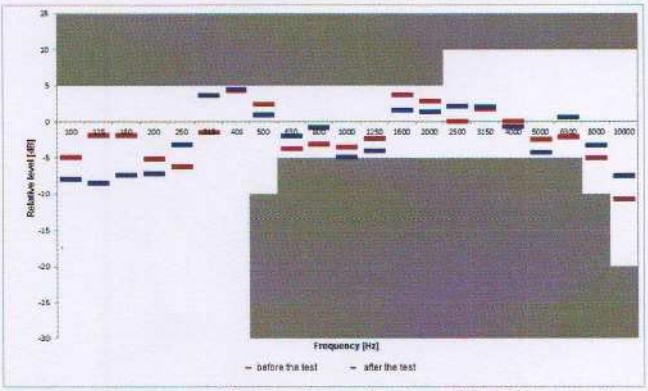
The frequency response of the loudspeaker type VA-585, specimen no. 8

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result
7.	Dry heat (operational) *Temperature +55 ±2 °C, Duration 16 h.*	p. 5.7	positive
	The loudspeaker was tested to prove the ability to function correctly at high temperatures. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.  The frequency response of the loudspeaker type VA-585, specimen no. 3		
8.	Cold (operational) *Temperature -10 ±3 °C, Duration 16 h.*	p. 5.9	positive
	The loudspeaker was tested to prove the ability to function correctly at low ambient temperatures. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.  The frequency response of the loudspeaker type VA-585, specimen no. 3		
9.	Damp heat, cyclic (operational) *Lower temperature. +25 ±3 °C by relative humidity >95%, Upper temperature. +40 ±2 °C by relative humidity 93 ±3 %, Number of cycles 2,Duration of one cycle: 24 h.*	p. 5.10	positive
	The loudspeaker was tested to prove the immunity to an environment with high relative humidity. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.  The frequency response of the loudspeaker type VA-585, specimen no. 3		

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result
10.	Damp heat, steady state (endurance) *Temperature: +40 ±2 °C, relative humidity 93 ±3%, duration: 21 days.*	p. 5.11	positive
	The loudspeaker was tested to prove the ability to withstand the long term effects of humidity in the service environment. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.		
			
	The frequency response of the loudspeaker type VA-565, specimen no. 1		
11.	SO_2 – corrosion (endurance) *Content of SO_2 25 ±5 ppm, Temperature 25±2 °C, relative humidity 93 ±3 %, Duration: 21 days.*	p. 5.13	positive
	The loudspeaker was tested to prove the ability to withstand the corrosive effect of sulphur dioxide as an atmospheric pollutant. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.		
			
	The frequency response of the loudspeaker type VA-565, specimen no. 4		
12.	Impact (operational) Impact energy: 0,5 ± *0,04 J, Number of impacts per accessible point: 3.*	p. 5.15	positive
	The loudspeaker was tested to prove the immunity to mechanical impacts upon its surface. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.		
			
	The frequency response of the loudspeaker type VA-575, specimen no. 6		

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result
13.	Vibration sinusoidal (operational) *Frequency range 10 ÷ 150 Hz, Acceleration amplitude 0,5 g; Number of axis: 3, Sweep rate:1 octave/min, Number of sweep cycles per axis per functional conditions 1.*	p. 5.16	positive
	The loudspeaker was tested to prove the immunity to vibration at levels considered appropriate to the normal service environment. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.  The frequency response of the loudspeaker type VA-585, specimen no. 7		
14.	Vibration sinusoidal (endurance) *Frequency range 10 ÷ 150 Hz, acceleration amplitude 1 g, Number of axis 3, Sweep rate 1 octave/min, Number of sweep cycles per axis per functional conditions: 20.*	p. 5.17	positive
	The loudspeaker was tested to prove the ability to withstand the long term effects of vibration at levels appropriate to the service environment. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.  The frequency response of the loudspeaker type VA-585, specimen no. 7		
15.	Enclosure protection *IP 21C*	p. 5.18	positive
	The loudspeaker was tested to demonstrate that the degree of protection provided by the enclosure of the loudspeaker with regard to the ingress of solid foreign objects with minimal diameter of 12 mm (IP2x), the harmful effects due to the ingress of water, dripping water (IPx1) and the ingress of solid foreign objects with minimal diameter of 2,5 mm (IPxxC). The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curve complies with the frequency response limits described in 4.2 of EN 54-24:2008.  The frequency response of the loudspeaker type VA-575, specimen no. 6		

Tests not accredited by PCA (Polish Centre for Accreditation):

No.	Product characteristic tested	Test method according to PN-EN 54-24:2008	Test result
1.	Compliance	p. 4.1	positive
2.	Shock (operational) *Pulse type: half sine, Pulse duration: 6ms; Maximum acceleration related to specimen mass M in kg: 10x(100-20M); Number of shock per direction: 6, Number of pulses per direction: 3*	p. 5.14	positive
	The loudspeaker was tested to prove the immunity to mechanical shocks. The frequency response curve does not deviate from the one measured before the test by more than ±3dB, between and including 500 Hz and 8 kHz, the frequency response curves complies with the frequency response limits described in 4.2 of EN 54-24:2008.  The frequency response of the loudspeaker type VA-575, specimen no. 5		

The results were adopted from the protocols of the tests annexed to 3rd copy of the polish version of the testing report.

5. REPRESENTATIONS AND RESERVATIONS

Testing results only apply to the tested sample of product / testing object. The report cannot be copied except in a full form, unless otherwise allowed by the Laboratory. The english version of the testing report has been prepared in 2 copies.

END OF REPORT

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