

Statement concerning the sound reduction of Multifix and Multifix fire electrical boxes

Requested by	Schneider Electric Sverige AB Box 1009 611290 Nyköping SWEDEN
Order ref.	VWZ0PT200022-01
Contact person	Eurofins Expert Services Oy Mika Lojander MikaLojander@eurofins.fi Tekniikantie 4 B 02150 Espoo Finland
Assignment	Statement concerning the sound reduction of Multifix and Multifix fire electrical boxes. This statement is not in the scope of accreditation.
Subject	<p>The customer has two different lines of electrical boxes Flexi+ and Multifix, appendix 2. Customer declares that the boxes are made from same materials and the difference in fire and standard version is that fire boxes have small fire pads in the bottom of the box. Customer commissioned Eurofins Expert Service Oy to determine airborne sound reduction index of wall structure with different combinations of ELKO Flexi+ fire electrical boxes (test report EUFI29-21006133-T2-EN).</p> <p>Customer also commissioned Eurofins Expert Services to do comparison measurements between the two box lines, appendix 1. Comparison measurements were done according to Standards <i>EN ISO 10140-1</i> [1], <i>EN ISO 10140-2</i> [2] and <i>EN ISO 717-1</i> [3] and were performed on 2.12.2021. Measurements were done so that two boxes with devices and approx. 300-500mm of wiring and electrical piping were installed to vertical beam of the small reference wall. The wall was 1200 x 1200mm in size and had a construct of 2 x 13mm gypsum boards, 95/40 metal profiles, 95 mm Isover acoustic wool (13kg/m³) and 2 x 13mm gypsum board.</p> <p>Customer also wanted to see if there is difference between the beam mounting and back wall mounting where the boxes are installed to the back wall with the help of mounting pieces.</p>
Statement	<p>Differences between ELKO Flexi+ fire, Multifix and Multifix fire main boxes shown in appendix 2 are very minor and have a minimal effect in sound insulation, as seen in table 1 and appendix 1. Mounting method also has minimal effect in sound insulation.</p> <p>From these results we can determine that the test results obtained for ELKO Flexi+ fire in the report EUFI29-21006133-T2-EN (table 2) are valid also for Multifix and Multifix fire electrical boxes with beam or back wall mounting, inside the repeatability of 1 dB, which is normally achievable for single-number quantities in laboratories.</p>

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Table 1. The weighted sound reduction index of wall structure with ELKO Flexi+ Fire, Multifix and Multifix fire electrical boxes. The values $R_w + C$ and $R_w + C_{tr}$ are also presented.

ELKO Flexi+ fire, Multifix and Multifix fire				
Test nr.	Structure / boxes	R_w dB	$R_w + C$ dB	$R_w + C_{tr}$ dB
2.	Reference wall + 2 x ELKO Flexi+ fire	54	52	48
3.	Reference wall + 2 x Multifix	54	52	47
4.	Reference wall + 2 x Multifix fire	54	52	47
5.	Reference wall + 2 x Multifix (back wall mounting)	54	53	47
6.	Reference wall (2 x gypsum board (12,5mm) / 95 mm rockwool (13kg/m3) / 2 x gypsum board (12,5 mm) / 95 mm metal studs)	54	52	47

Table 2. The weighted sound reduction index of wall structure with Flexi+ fire electrical boxes (from test report EUFI29-21006133-T2-EN). The values $R_w + C$ and $R_w + C_{tr}$ are also presented

ELKO Flexi+ fire (report EUFI29-21006133-T2-EN)					
Test No.	Type	Structure / boxes	R_w dB	$R_w + C$ dB	$R_w + C_{tr}$ dB
1.	Reference (Wall-1)	2 x gypsum board (12,5mm) / 100 mm rockwool (32kg/m3) / 2 x gypsum board (12,5 mm) / 95 mm metal studs	54	51	45
2.	One side (Wall-2)	3 x 1M / 4 x 1,5M / 2 x 2M	53	51	45
3.	Both sides not back to back (Wall-3)	Source room: 3 x 1M / 4 x 1,5M / 2 x 2M Receiving room: 3 x 1M / 4 x 1,5M / 2 x 2M	53	50	43
4.	Both sides back to back (Wall-4)	Source room: 3 x 1M / 4 x 1,5M / 2 x 2M Receiving room: 3 x 1M / 4 x 1,5M / 2 x 2M	50	48	44

Box setup, construct and size of the reference wall were different in measurements presented in table 1 and table 2.

Espoo, 3.3.2022

Mika Lojander

Expert

The statement is electronically signed

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Expert Services

References	<p><i>FINAS Finnish Accreditation Service has accredited our laboratory (T001, Eurofins Expert Services Oy) to perform measurements according to standards listed below.</i></p> <p>[1] <i>EN ISO 10140-1:2021 Acoustics - Laboratory measurement of sound insulation of building elements - Part 1: Application rules for specific products</i></p> <p>[2] <i>ISO 10140-2:2010 Acoustics - Measurement of sound insulation in buildings and of building elements - Part 2: Laboratory measurements of airborne sound insulation of building elements</i></p> <p>[3] <i>ISO 717-1:2020 Acoustics - Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation</i></p>
Appendices	3
Distribution	Customer, electronically approved

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Client: Schneider Electric

Product identification: 2. ELKO Flexi+ fire

Test specimen mounted by: Client
 Date of test: 2.12.2021

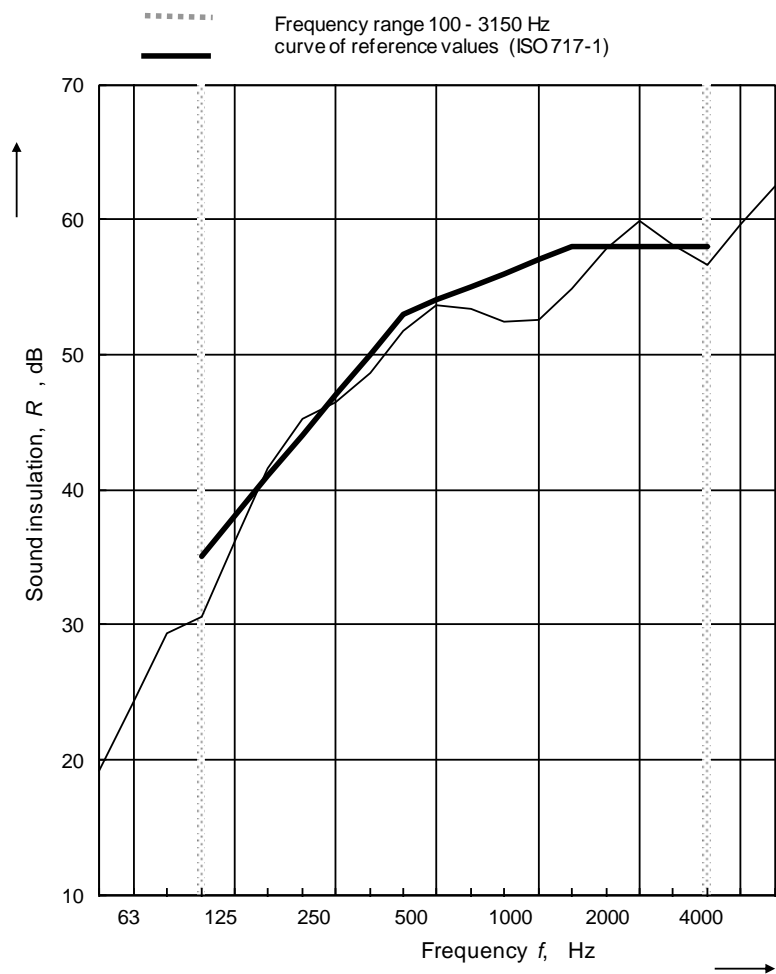
Construct: 2 x 13mm gyproc gybsum board /
 Isover acoustic wool /
 2 x 13mm gyproc gybsum board /
 Metal profiles 95/40

Description of test specimen and test conditions:

Areas of test specimen: 1,44 m²
 Air temp. in the test rooms: 19,5 °C
 Air humidity in the test rooms: 27 %
 Barometric pressure 99,1 kPa
 Source room volume: 102 m³
 Receiving room volume: 131 m³

2 x ELKO Flexi+ fire 1 Module boxes
 (with devices, cables and piping)
 Installed to transmission side.

<i>f</i> Frequency Hz	<i>R</i> One-third octave dB
50	19,1
63	24,3
80	29,4
100	30,5
125	36,1
160	41,5
200	45,2
250	46,5
315	48,6
400	51,7
500	53,6
630	53,4
800	52,4
1000	52,5
1250	54,9
1600	57,8
2000	59,9
2500	58,1
3150	56,6
4000	59,6
5000	62,5



Rating according to ISO 717-1:							
$R_w (C; C_{tr})$	= 54 (-2; -6) dB;	$C_{50-3150}$	= -3 dB;	$C_{50-5000}$	= -2 dB;	$C_{100-5000}$	= -1 dB;
Evaluation based on laboratory measurement results obtained by an engineering method:							
$C_{tr,50-3150}$	= -13 dB;	$C_{tr,50-5000}$	= -13 dB;	$C_{tr,100-5000}$	= -6 dB;		

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Client: Schneider Electric

Product identification: 3. Multifix

Test specimen mounted by: Client
Date of test: 2.12.2021

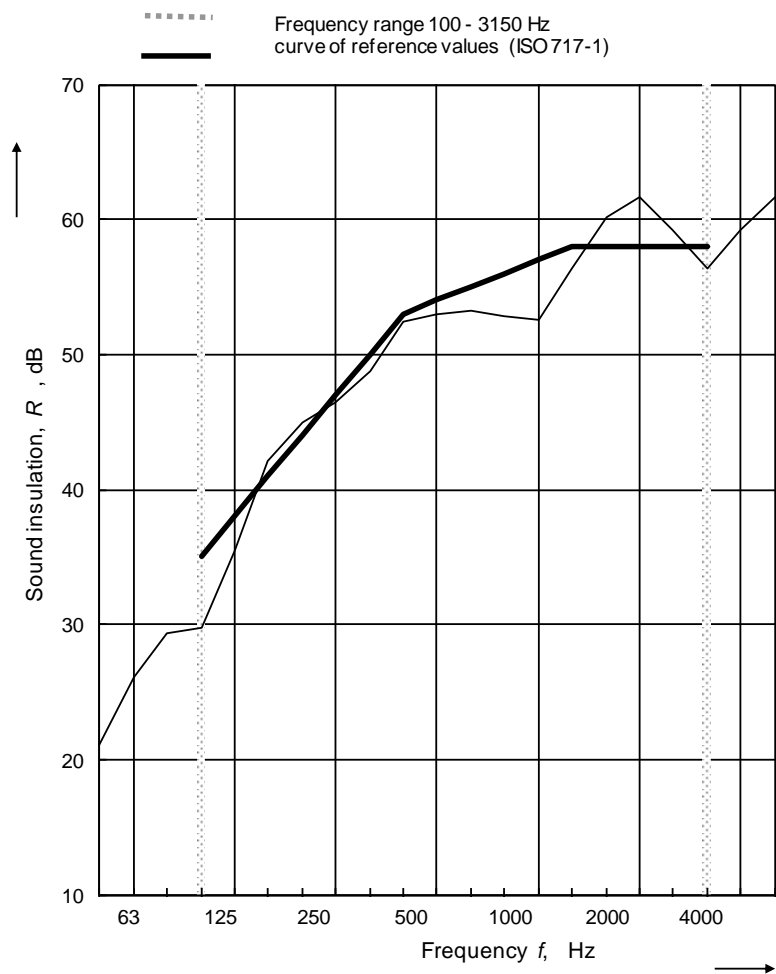
Construct: 2 x 13mm gyproc gypsum board /
Isover acoustic wool /
2 x 13mm gyproc gypsum board /
Metal profiles 95/40

Description of test specimen and test conditions:

Areas of test specimen: 1,44 m²
Air temp. in the test rooms: 19,5 °C
Air humidity in the test rooms: 27 %
Barometric pressure 99,1 kPa
Source room volume: 102 m³
Receiving room volume: 131 m³

2 x Multifix 1 Module boxes
(with devices, cables and piping)
Installed to transmission side.

<i>f</i> Frequency Hz	<i>R</i> One-third octave dB
50	21,1
63	26,1
80	29,3
100	29,8
125	35,4
160	42,1
200	45,0
250	46,4
315	48,7
400	52,4
500	52,9
630	53,3
800	52,8
1000	52,6
1250	56,4
1600	60,1
2000	61,6
2500	59,2
3150	56,3
4000	59,2
5000	61,6



Rating according to ISO 717-1:							
$R_w (C; C_{tr})$	= 54 (-2; -7) dB;	$C_{50-3150}$	= -3 dB;	$C_{50-5000}$	= -2 dB;	$C_{100-5000}$	= -1 dB;
Evaluation based on laboratory measurement results obtained by an engineering method:		$C_{tr,50-3150}$	= -12 dB;	$C_{tr,50-5000}$	= -12 dB;	$C_{tr,100-5000}$	= -7 dB;

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Client: Schneider Electric

Product identification: 4. Multifix fire

Test specimen mounted by: Client
Date of test: 2.12.2021

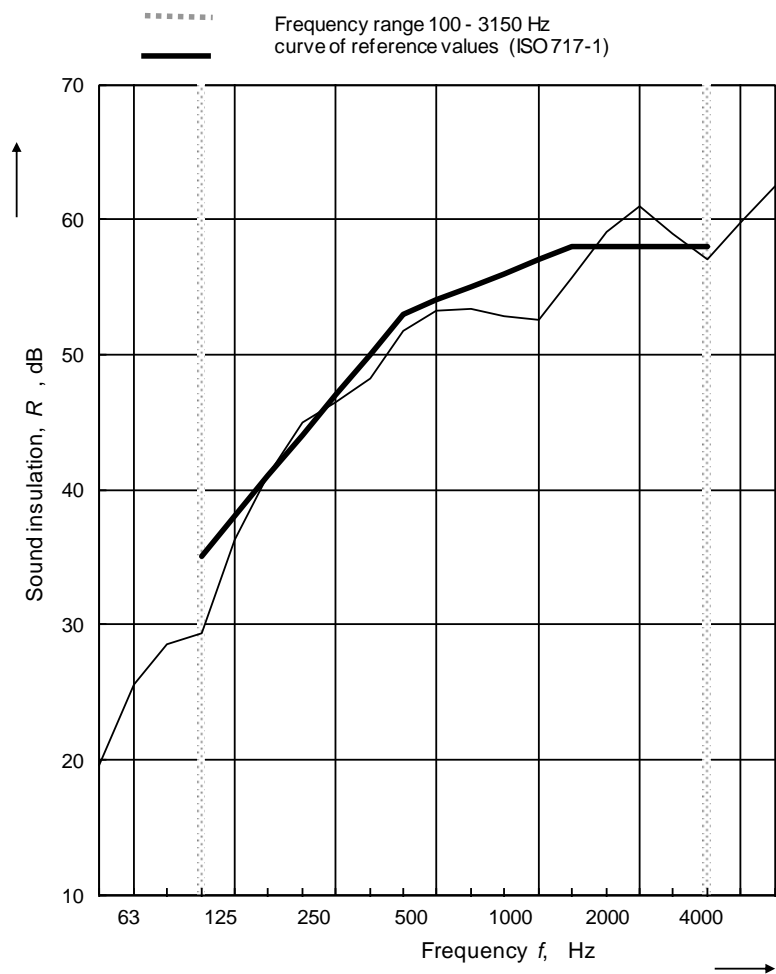
Construct: 2 x 13mm gyproc gypsum board /
Isover acoustic wool /
2 x 13mm gyproc gypsum board /
Metal profiles 95/40

Description of test specimen and test conditions:

Areas of test specimen: 1,44 m²
Air temp. in the test rooms: 19,5 °C
Air humidity in the test rooms: 27 %
Barometric pressure 99,1 kPa
Source room volume: 102 m³
Receiving room volume: 131 m³

2 x Multifix fire 1 Module boxes
(with devices, cables and piping)
Installed to transmission side.

<i>f</i> Frequency Hz	<i>R</i> One-third octave dB
50	19,6
63	25,6
80	28,5
100	29,3
125	36,3
160	41,0
200	45,0
250	46,5
315	48,2
400	51,8
500	53,2
630	53,4
800	52,8
1000	52,6
1250	55,7
1600	59,1
2000	61,0
2500	59,0
3150	57,1
4000	59,7
5000	62,4



Rating according to ISO 717-1:							
$R_w (C; C_{tr})$	= 54 (-2; -7) dB;	$C_{50-3150}$	= -3 dB;	$C_{50-5000}$	= -2 dB;	$C_{100-5000}$	= -1 dB;
Evaluation based on laboratory measurement results obtained by an engineering method:		$C_{tr,50-3150}$	= -13 dB;	$C_{tr,50-5000}$	= -13 dB;	$C_{tr,100-5000}$	= -7 dB;

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Client: Schneider Electric

Product identification: 5. Multifix (back wall mounting)
(back wall mounting)

Test specimen mounted by: Client
Date of test: 2.12.2021

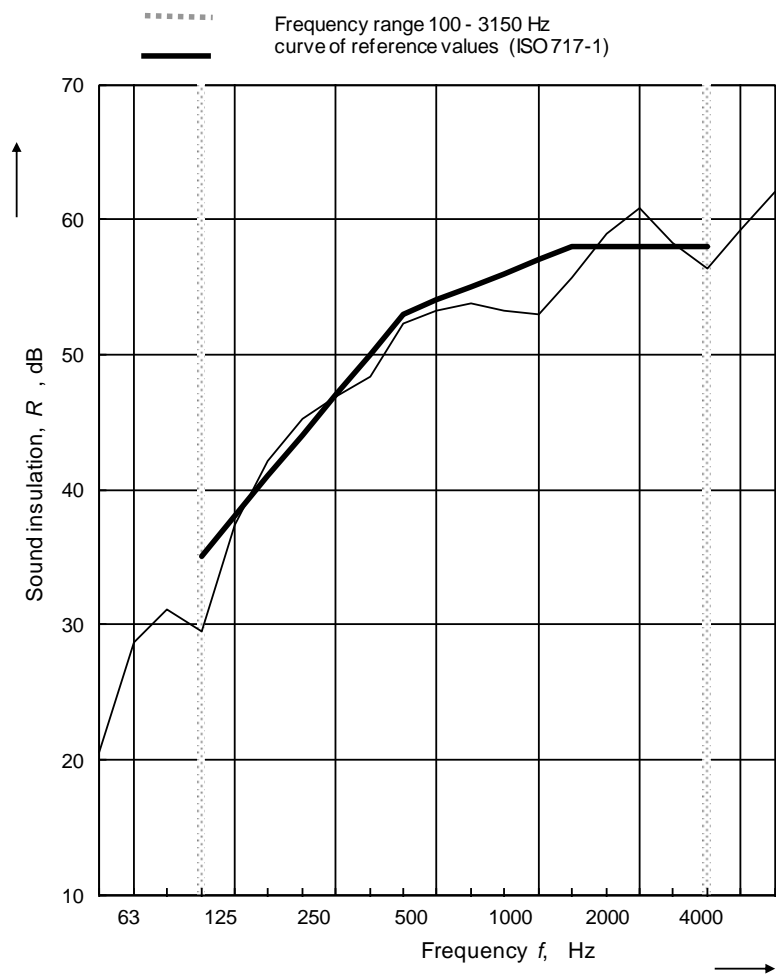
Construct: 2 x 13mm gyproc gybsum board /
Isover acoustic wool /
2 x 13mm gyproc gybsum board /
Metal profiles 95/40

Description of test specimen and test conditions:

Areas of test specimen: 1,44 m²
Air temp. in the test rooms: 19,5 °C
Air humidity in the test rooms: 27 %
Barometric pressure 99,1 kPa
Source room volume: 102 m³
Receiving room volume: 131 m³

2 x Multifix 1 Module boxes
(with devices, cables and piping)
2 x back wall mounting pieces.

<i>f</i> Frequency Hz	<i>R</i> One-third octave dB
50	20,5
63	28,6
80	31,1
100	29,5
125	37,3
160	42,1
200	45,2
250	46,8
315	48,3
400	52,3
500	53,3
630	53,8
800	53,2
1000	53,0
1250	55,7
1600	59,0
2000	60,8
2500	58,2
3150	56,4
4000	59,2
5000	62,0



Rating according to ISO 717-1:							
$R_w (C; C_{tr})$	= 54 (-1; -7) dB;	$C_{50-3150}$	= -3 dB;	$C_{50-5000}$	= -2 dB;	$C_{100-5000}$	= -1 dB;
Evaluation based on laboratory measurement results obtained by an engineering method:		$C_{tr,50-3150}$	= -12 dB;	$C_{tr,50-5000}$	= -12 dB;	$C_{tr,100-5000}$	= -7 dB;

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Client: Schneider Electric

Product identification: 6. Reference wall

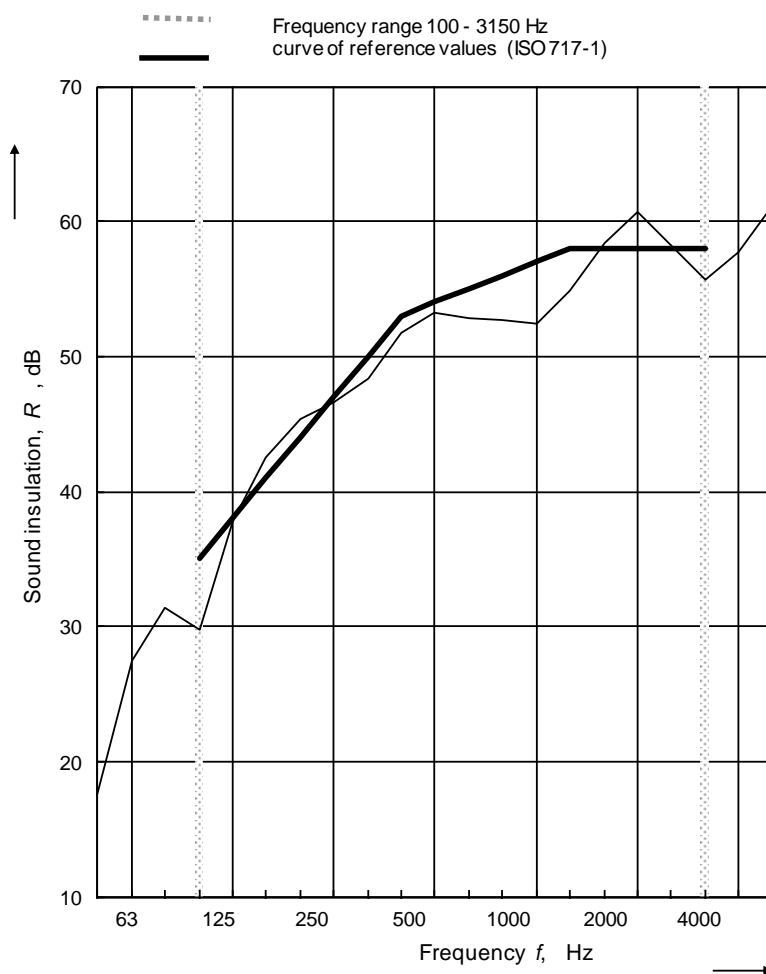
Test specimen mounted by: Client
Date of test: 2.12.2021

Construct: 2 x 13mm gyproc gybsum board /
Isover acoustic wool /
2 x 13mm gyproc gybsum board /
Metal profiles 95/40

Description of test specimen and test conditions:

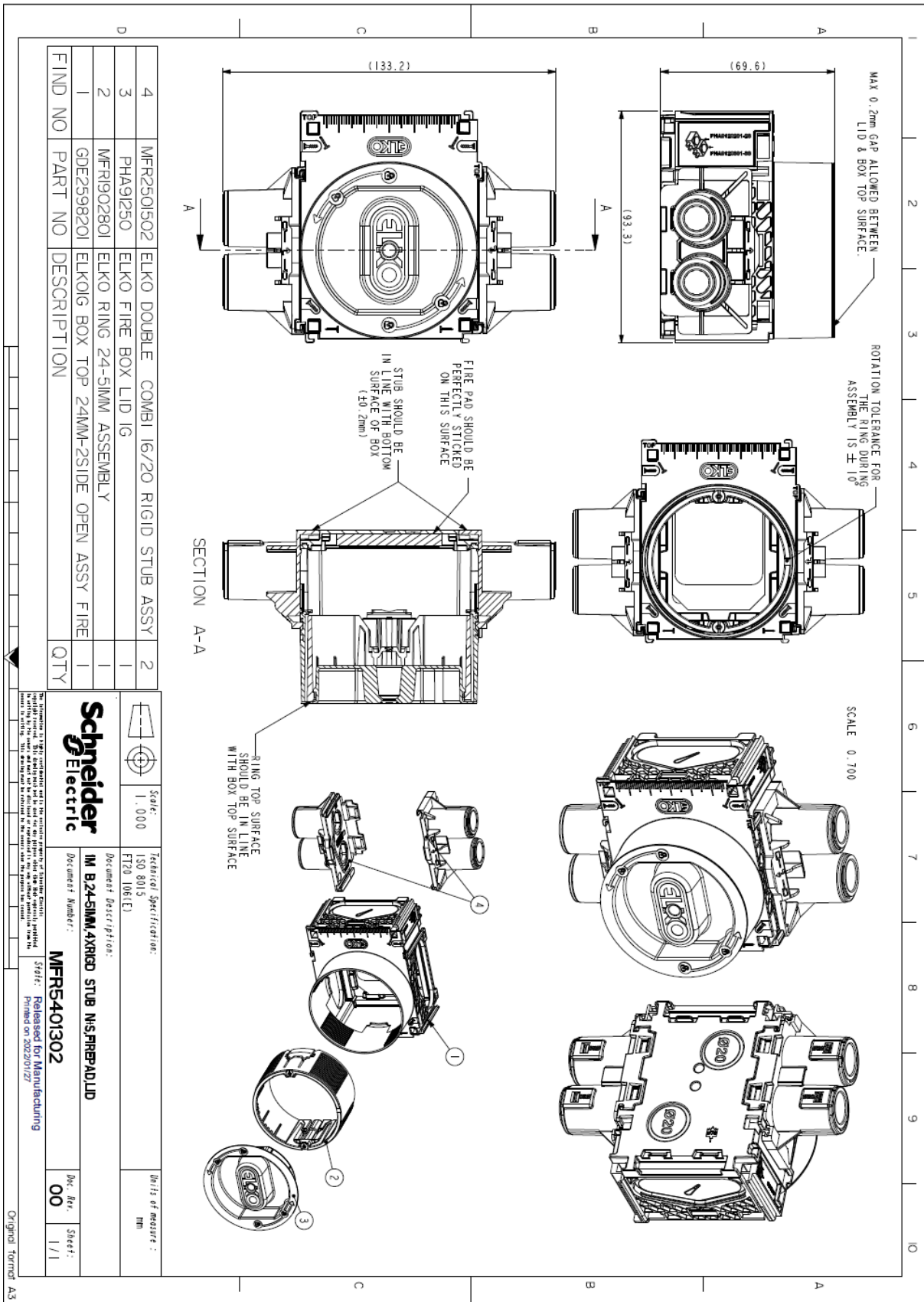
Areas of test specimen: 1,44 m²
Air temp. in the test rooms: 19,5 °C
Air humidity in the test rooms: 27 %
Barometric pressure 99,1 kPa
Source room volume: 102 m³
Receiving room volume: 131 m³

<i>f</i> Frequency Hz	<i>R</i> One-third octave dB
50	17,5
63	27,4
80	31,4
100	29,7
125	37,7
160	42,5
200	45,3
250	46,6
315	48,4
400	51,7
500	53,2
630	52,8
800	52,7
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2000	60,7
2500	58,3
3150	55,7
4000	57,7
5000	61,2



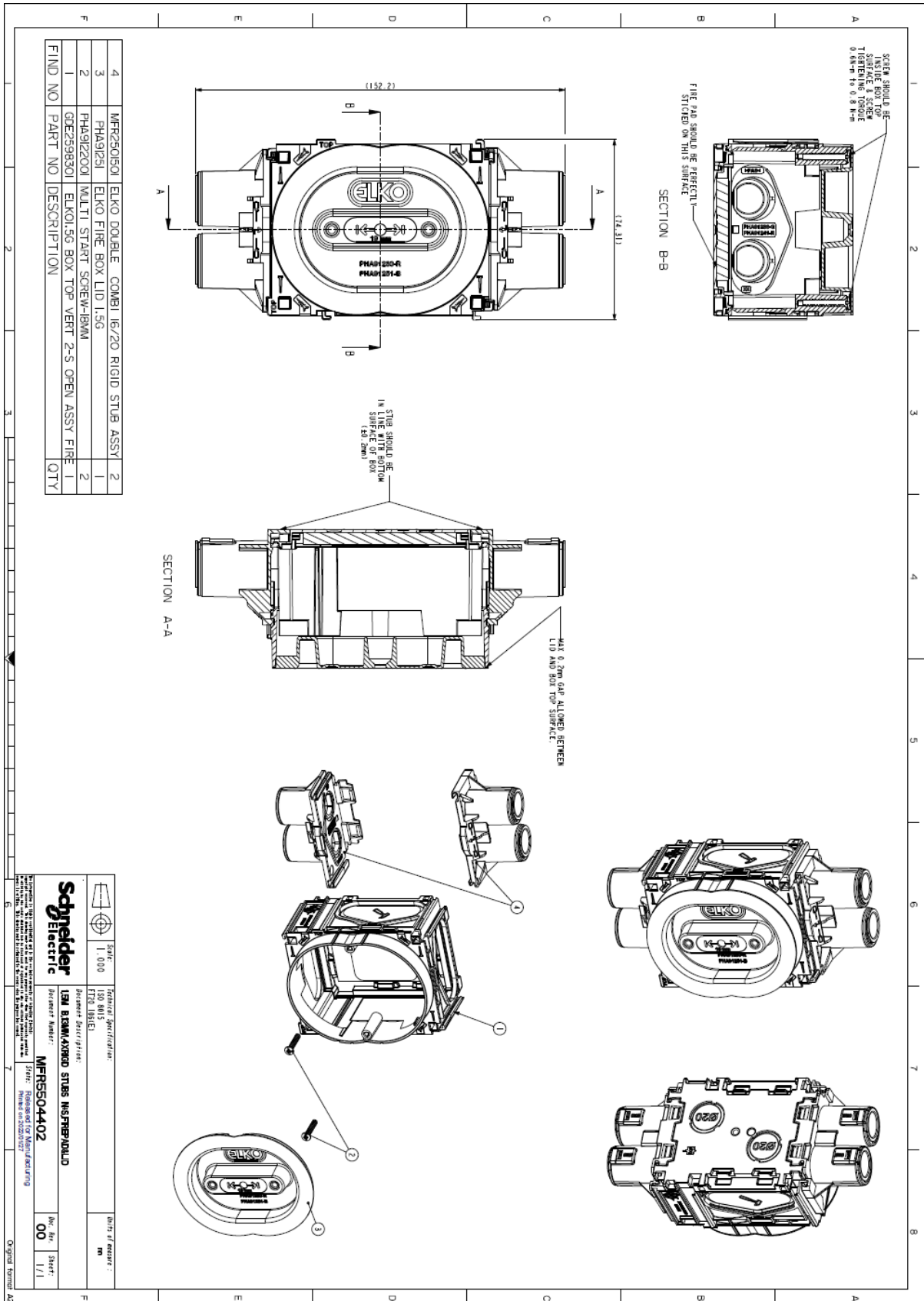
Rating according to ISO 717-1:			
$R_w (C; C_{tr})$	= 54 (-2; -7) dB;	$C_{50-3150}$	= -3 dB;
Evaluation based on laboratory measurement results obtained by an engineering method:		$C_{50-5000}$	= -2 dB;
		$C_{100-5000}$	= -1 dB;
		$C_{tr,50-3150}$	= -13 dB;
		$C_{tr,50-5000}$	= -13 dB;
		$C_{tr,100-5000}$	= -7 dB;

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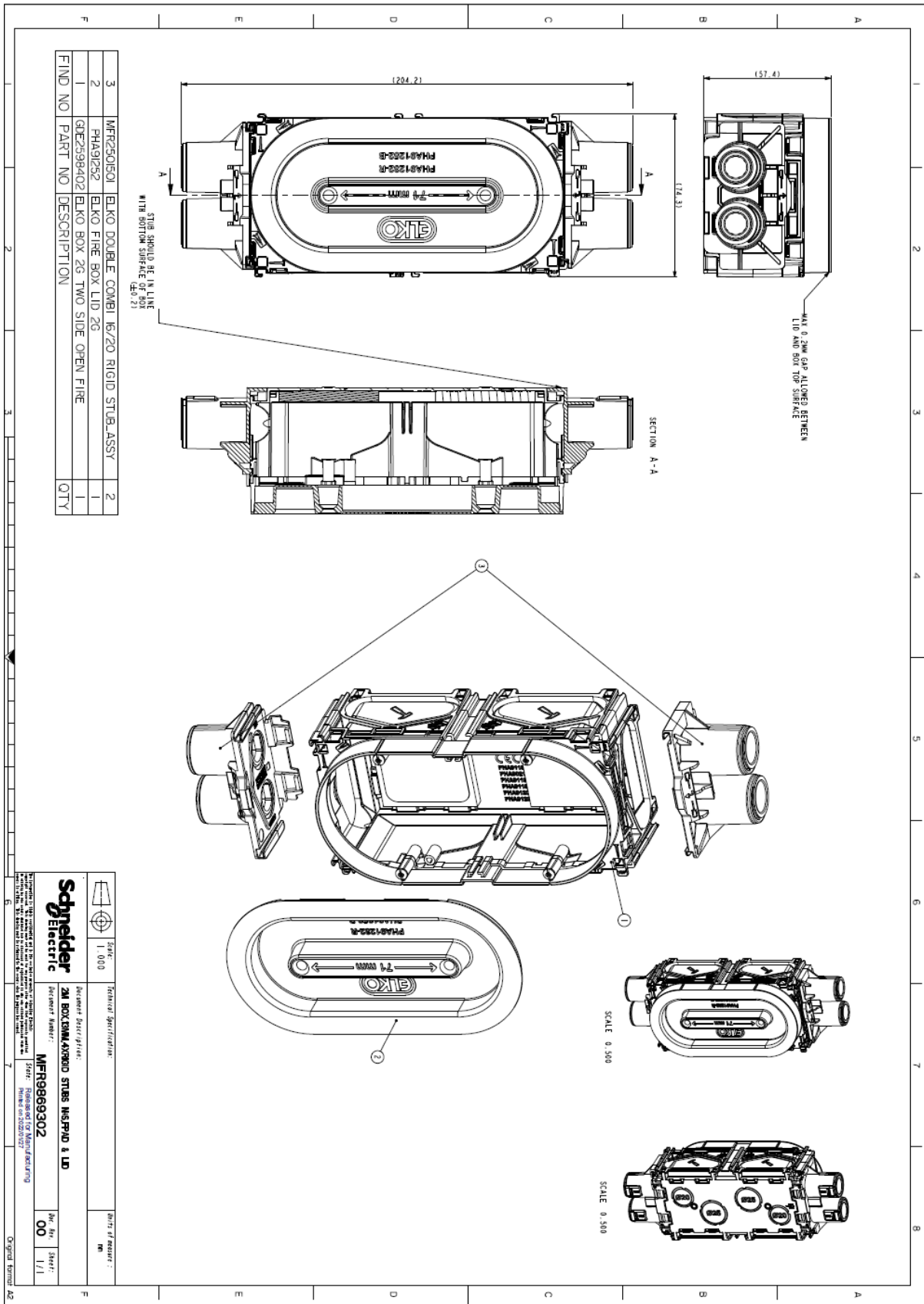
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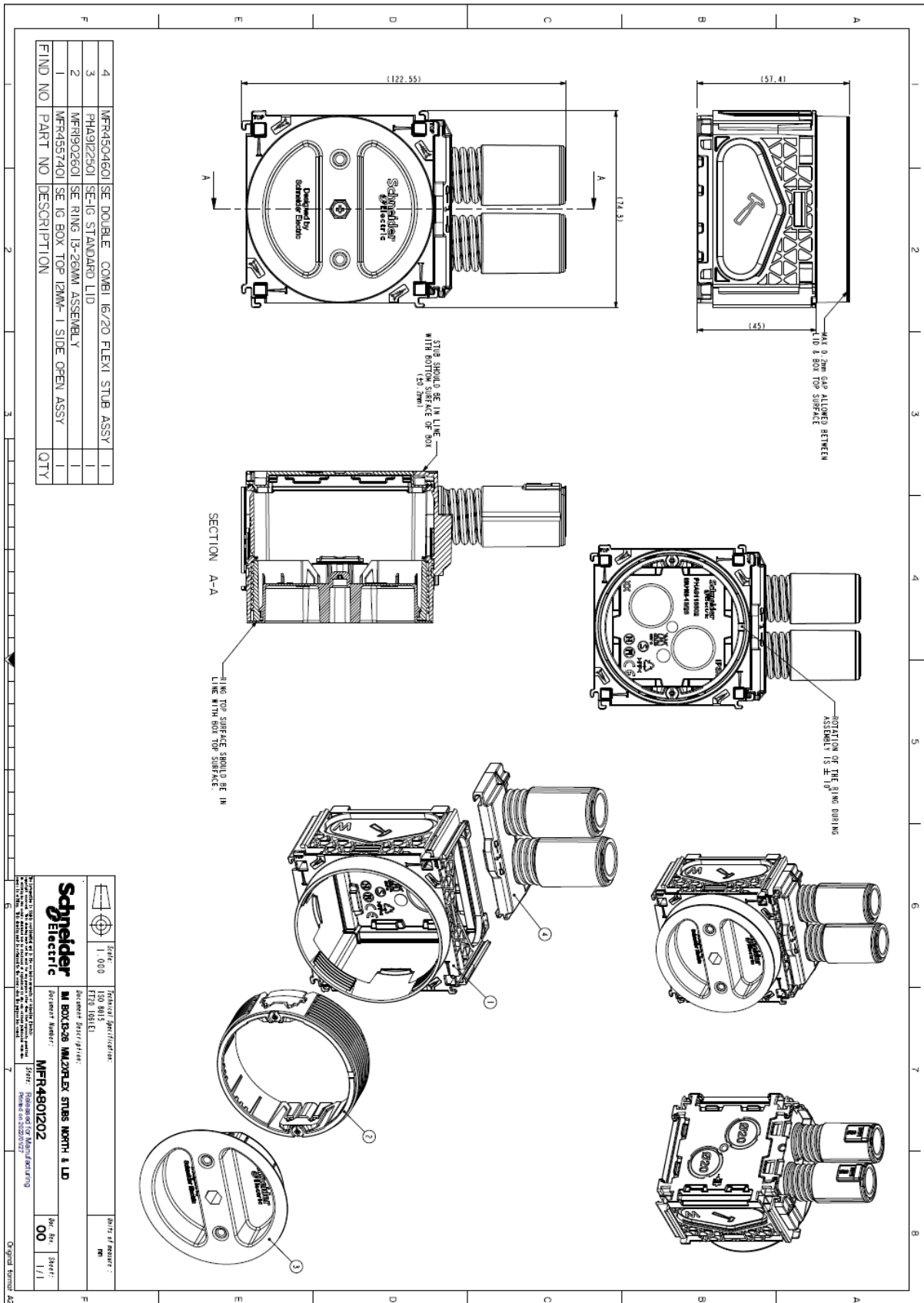
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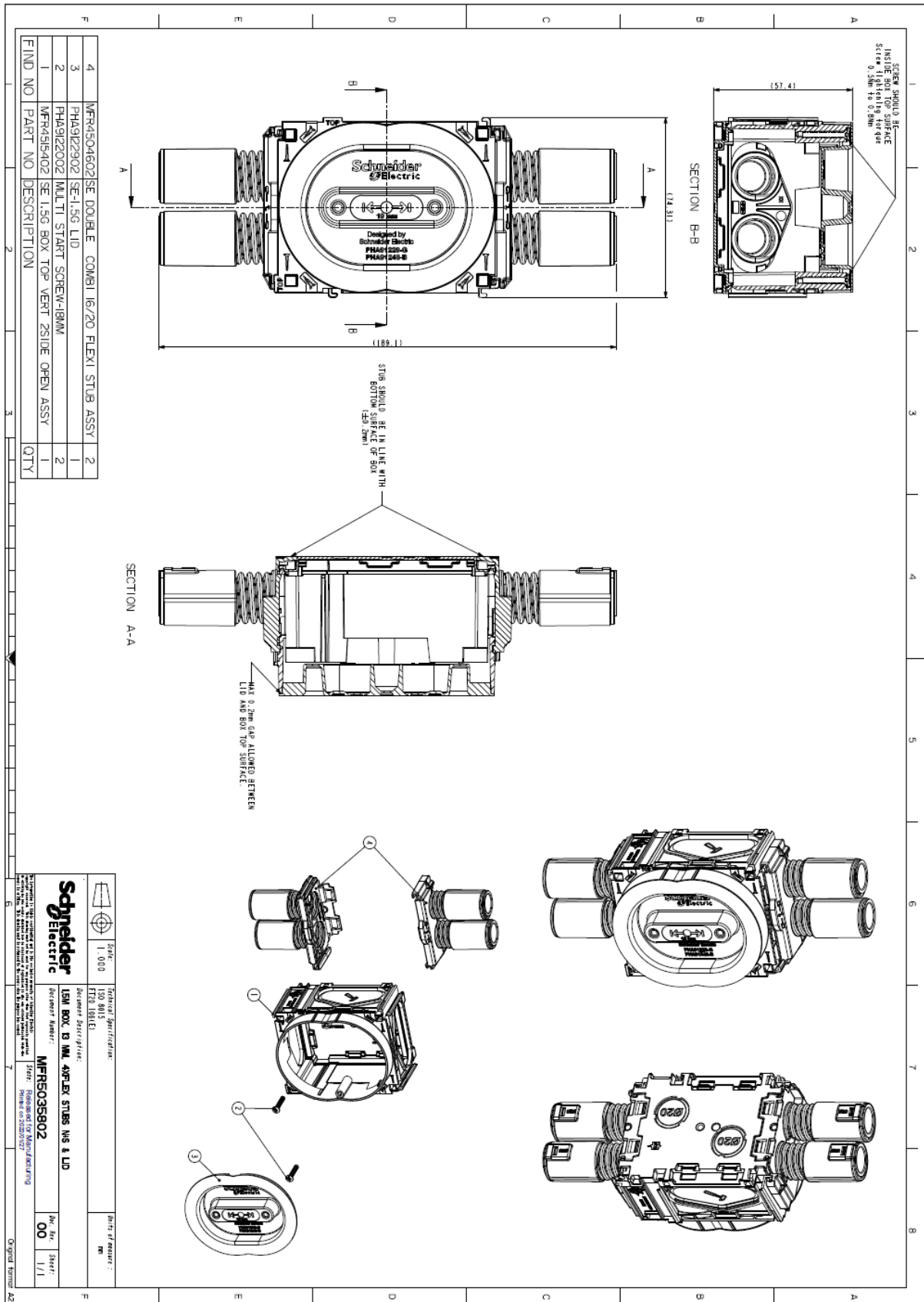
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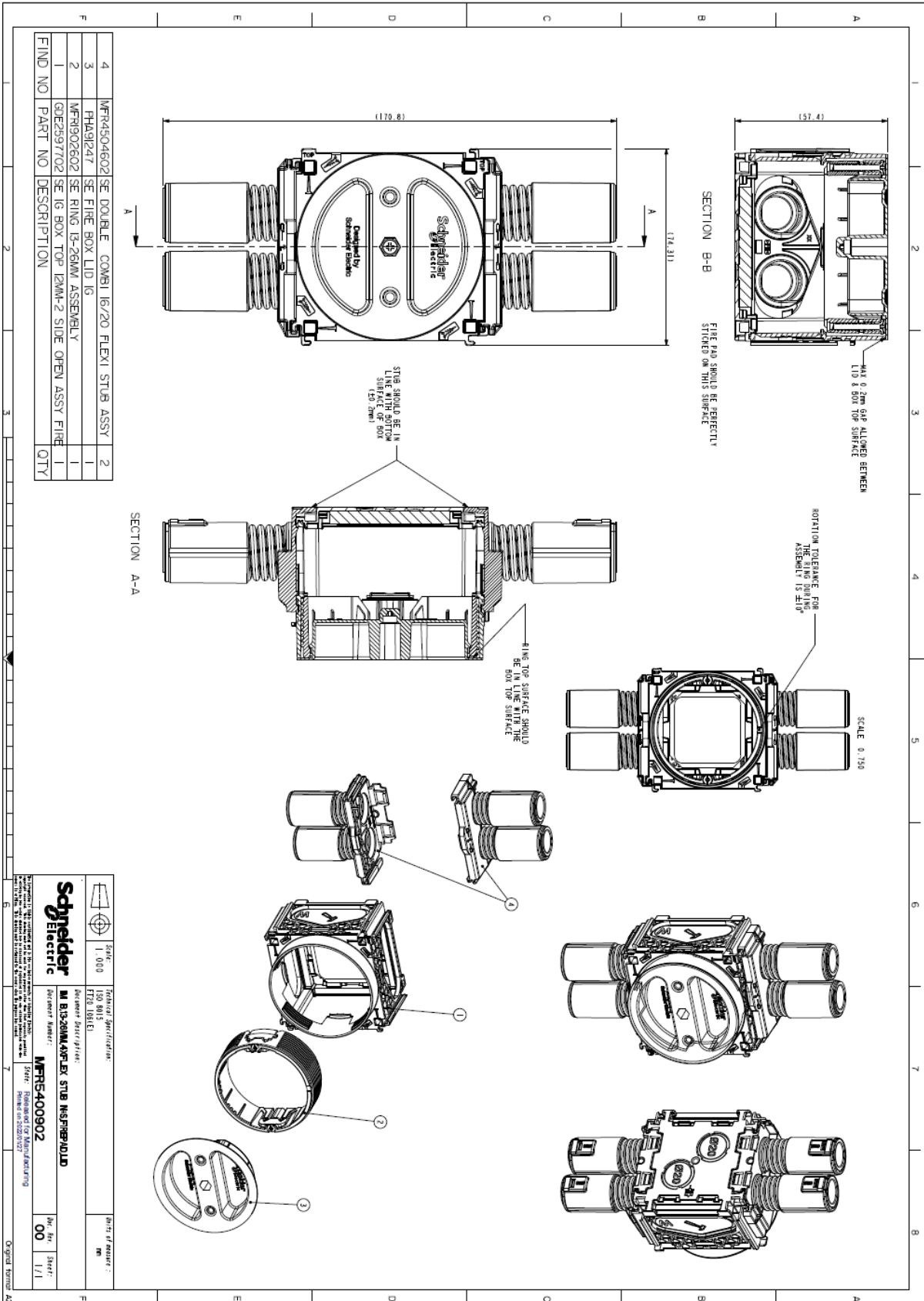
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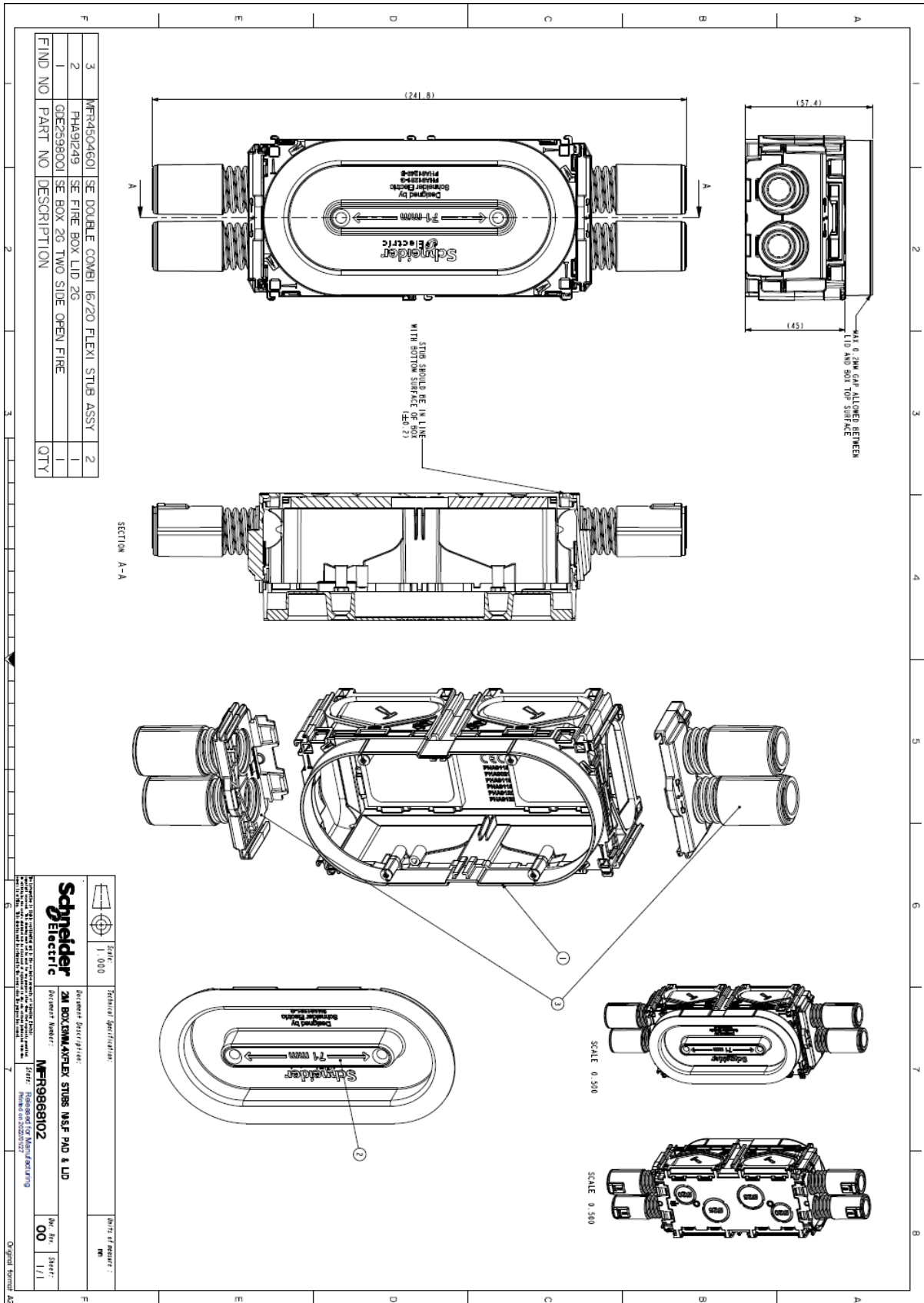
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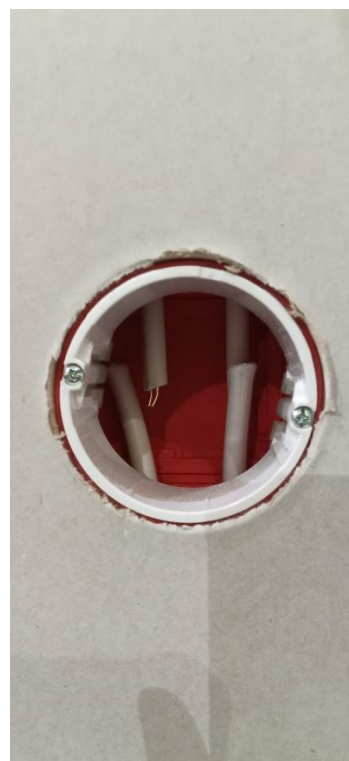
Picture 1. Reference wall



Picture 2. Flexi+ boxes installed to the reference wall



Picture 3. ELKO Flexi+ fire 1M



Picture 4. ELKO Flexi+ 1M

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Picture 5. Multifix fire



Picture 6. Multifix electrical box installed



Picture 7. Back wall mounting pieces



Picture 8. Multifix boxes with back wall mounting

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