



Test Certificate No. B 12793.1/23-7

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Applicant Raficon Trade SRL
Aleea Industriilor Nr. 2, 120068, Buzau, Romania

Test order Electrical measuring of a **Type B-FIBC acc. IEC 61340-4-4:2018**

Test piece *Flexible Intermediate Bulk Container (FIBC without inliner)*

Date of receipt 13.06.2023

Design	Manufacturer's type designation N / A
	Dimensions (120 cm x 80 cm) x 160 cm Volume 1500 litres Tare 3180 g
	Fabric of top, wall and bottom Polypropylene 170 g/m ² + 30 g/m ² coating, each with six blue coloured tapes white fabric layers
	Fabric of both spouts Polypropylene 65 g/m ² + 30 g/m ² coating, white fabric without coloured characterization
	Fabric of baffels Polypropylene 125 g/m ² incl. coating, white fabric without coloured characterization
	Suspensions Four blue PP-webbings (50 mm wide, 40 g/m), sewn onto the vertical seams in a length of 50 cm / 125 cm
	Details Four vertical seams, four horizontal seams at the bottom / overlock and chain stitching / all seams with dust proof cords / edges formstabilized (baffle bag) / top with filling spout d = 55 cm, single seam / discharge spout d = 40 cm, single seam / no inliner / document pocket made of transparent PE foil / SWL label made of white PE material, front side printed with black ink, rear side unprinted / yellow label with electrostatic information made of yellow PE material: front side printed with black ink, rear side unprinted

1. Breakdown Voltages of the fabrics

The breakdown voltages of the fabrics shall be less than 6000 V.

Test regulations	IEC 60243-2 "Methods of test for electric strength of solid insulation materials - Part 2: applied Additional requirements for tests using direct voltage"
Test apparatus	High-voltage power supply: Labordata DSS 75/25 USB
Electrodes	IEC 60243-1, Electrode device P75/P25
Test climate	Temperature 23 ± 2 °C and 20 ± 5 % RH acc. IEC 61340-4-4:2018
Test conditions	Five specimens of all three fabrics have been taken by a circular cutter (each specimen 100 cm ²) and have been installed into the measuring device LABORDATA P75/P25 USB (diameter of the electrodes d = 75 mm and d = 25 mm). A direct voltage has then been applied and increased up to breakdown at a speed of 300 V/s acc. IEC 61340-4-4:2018. Five measurements have been performed on each specimen.



Test results	<u>Fabric of top, wall and bottom</u>	
	Range of 25 values:	1943 V to 3071 V
	Total average of breakdown voltage:	2653 V
	<u>Fabric of both spouts</u>	
	Range of 25 values:	1103 V to 2129 V
	Total average of breakdown voltage:	1654 V
	<u>Fabric of baffels</u>	
	Range of 25 values:	1601 V to 2416 V
	Total average of breakdown voltage:	1940 V
In detail the values are listed in <u>annex 2</u> .		

2. Surface Resistivity of labels and document pockets

Type B FIBC labels and document pockets shall not be made from materials with Surface Resistivity of less than $1.0 \times 10^9 \Omega$, tested at a climate of $23 \pm 2 \text{ }^\circ\text{C}$ and $60 \pm 5 \text{ \% rH}$.

Test regulations	IEC 61340-2-3 "Electrostatics - Part 2-3: Methods of test for determining the resistance and resistivity of solid planar materials used to avoid electrostatic charge accumulation"	
Test apparatus	Teraohmmeter Labordata AW 200-4, 10 V / 100 V	
Electrodes	IEC 61340-2-3, Ring electrode	
	Outer diameter of inner electrode:	30 mm
	Inner diameter of annulus electrode:	56 mm
	Outer diameter of annulus electrode:	64 mm
Test conditions	The samples have been installed into the measuring device Labordata AW 200-4 and five measurements of both surfaces have been performed (preconditioning time > 12 h).	

Test results Document pocket

Front surface (Ω)	> 1.0×10^{13}	3.7×10^{11}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}
Rear surface (Ω)	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}

Yellow label with electrostatic information

Front surface (Ω)	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}
Rear surface (Ω)	5.3×10^{10}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}	5.6×10^{11}

SWL label

Front surface (Ω)	9.8×10^{12}	4.7×10^{10}	6.8×10^{10}	> 1.0×10^{13}	> 1.0×10^{13}
Rear surface (Ω)	1.3×10^{12}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}	> 1.0×10^{13}



3. Assessment of the test results

The FIBC is constructed from fabrics having an electrical breakdown voltage of less than 6000 V.

The materials of the document pocket, the SWL label and the yellow label have surface resistivity of higher than $1.0 \times 10^9 \Omega$.

The FIBC, the document pocket and both labels fulfill the conditions of IEC 61340-4-4:2018 "Standard test methods for specific applications – Electrostatic classification of flexible intermediate bulk containers (FIBCs) to be classified as

Type B FIBC without inliner

or in combination with suitable liners which meet the requirements of Type L2 or Type L3 acc. IEC 61340-4-4:2018 (see Note 6).

4. Notes

Note 1 Type B FIBCs shall be durably marked by means of permanently attached yellow labels, with at least the information and symbol ISO 7000-2415 as shown in annex 1.

The test piece has no liner.

It is not allowed to use liners without delivering proof of suitability.

Note 2 Type B-FIBCs are allowed to be used in zones 21 and 22 with MIE > 3 mJ, not allowed in zones 0, 1, 2 and 20.

The zones 0, 1 and 2 are places in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist

... is present continuously, for long periods or frequently.	= zone 0
... is likely to occur in normal operation occasionally.	= zone 1
... is not likely to occur in normal operation but, if it does occur, will persist for a short period only.	= zone 2

The zones 20, 21 and 22 are places in which an explosive atmosphere in a form of a cloud of combustible dust in the air

... is present continuously, for long periods or frequently.	= zone 20
... is likely to occur occasionally in normal operation.	= zone 21
... is not likely to occur in normal operations but, if it does occur, will persist for a short period only.	= zone 22

Note 3 It is the responsibility of the manufacturer to ensure the samples tested are representative of the production.



Note 4 If the electrical properties are guaranteed for each delivered FIBC and, at the same time, these properties are ensured by operational use on a continuous basis, then there is no electrostatic concern regarding the use of these Type B FIBCs in the above mentioned hazardous zones.

This statement applies on the condition that the manufactured FIBCs match the test sample. The conformity of the products manufactured by the manufacturer with the test sample is not monitored by LABORDATA.

Note 5 Testing and certifying of the Safe Working Load (SWL) acc. ISO 21898 was not subject of the order.

Note 6 Type L2 liner requirements:

The surface resistivity of both surfaces shall be between $1.0 \times 10^9 \Omega$ and $1.0 \times 10^{12} \Omega$ (no measurement of a breakdown voltage is required).

If the surface resistivity of one surface is between $1.0 \times 10^9 \Omega$ and $1.0 \times 10^{12} \Omega$, and of the other surface higher than $1.0 \times 10^{12} \Omega$, then in addition, a breakdown voltage of less than 4000 V is required.

Type L3 liner requirements:

The surface resistivity of both surfaces shall be higher than $1.0 \times 10^{12} \Omega$ and the breakdown voltage of less than 4000 V is required.

Note 7 This certificate expires on 31.07.2026.

Competent Engineer

Dipl.-Inform. Fröchtling



Head of Institute


Dr.-Ing. Kielbassa



Annex 1 / Test Certificate No. B 12793.1/23-7



Photo of the test piece

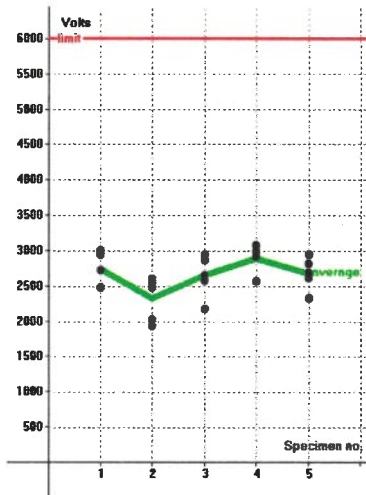
IEC 61340-4-4	<ul style="list-style-type: none">• Permitted in dust zone 21-22 with MIE > 3 mJ• Electrical properties may be affected by general usage, contamination and reconditioning• All conductive objects, including personnel shall be earthed during FIBC filling and emptying operations (see IEC/TS 60079-32-1 for guidance on earthing)
	
TYPE B	

Sample label of Type B-FIBC



Annex 2 / Test Certificate No. B 12793.1/23-7

Breakdown voltages of top, wall and bottom

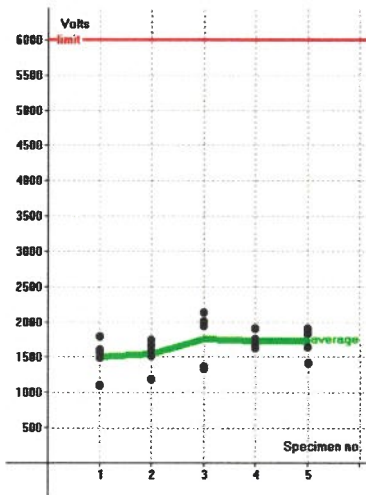


Specimen no.	Maximum voltage readings					Average Volts	Weight g/m ²
1	2719	3017	2944	2490	2490	2732	188
2	2607	2036	1943	2490	2563	2327	192
3	2949	2871	2573	2187	2646	2645	195
4	2568	2910	2915	2983	3071	2889	196
5	2807	2680	2607	2333	2949	2675	188

Average weight incl. coating 192 g/m²
Standard derivation 296 V
Coefficient of variation 11 %
95% confidence interval +/- 122 V

Maximum breakdown voltage 3071 V
Total average breakdown voltage 2653 V

Breakdown voltages of both spouts

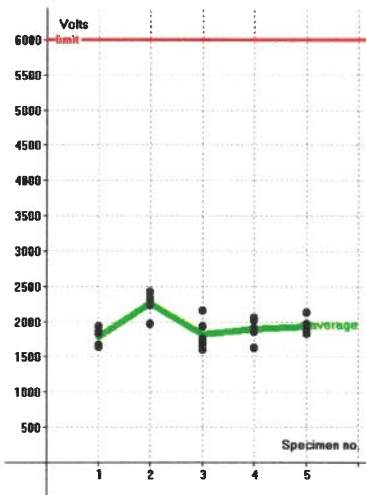


Specimen no.	Maximum voltage readings					Average Volts	Weight g/m ²
1	1572	1601	1494	1103	1791	1512	90
2	1665	1513	1596	1186	1748	1541	89
3	1948	2011	2128	1367	1342	1759	98
4	1674	1635	1904	1665	1752	1726	100
5	1416	1826	1865	1909	1640	1731	96

Average weight incl. coating 95 g/m²
Standard derivation 244 V
Coefficient of variation 14 %
95% confidence interval +/- 100 V

Maximum breakdown voltage 2129 V
Total average breakdown voltage 1654 V

Breakdown voltages of baffles



Specimen no.	Maximum voltage readings					Average Volts	Weight g/m ²
1	1938	1835	1855	1640	1669	1787	120
2	2314	2338	2236	1972	2416	2255	126
3	2163	1933	1752	1679	1601	1825	137
4	1909	2016	1635	1860	2055	1895	121
5	1899	2128	1831	1860	1972	1938	119

Average weight incl. coating 125 g/m²
Standard derivation 222 V
Coefficient of variation 11 %
95% confidence interval +/- 91 V

Maximum breakdown voltage 2416 V
Total average breakdown voltage 1940 V