

**The Appendix is an integral part of
Certificate of Accreditation No. 664/2024 of 5/12/2024**

Accredited entity according to ČSN EN ISO/IEC 17025:2018:

ETD TRANSFORMÁTORŮ a.s.
CAB number 1526, ELECTRICAL TESTING LABORATORY
Zborovská 54/22, Doudlevice, 301 00 Plzeň

The laboratory applies a flexible approach to the scope of accreditation.

The current list of activities carried out within the flexible scope is available on the laboratory's website www.etd-transformers.com/cz/elektrotechnicka-zkusebna in the form of the „List of activities within the flexible scope of accreditation“.

The laboratory provides opinions and interpretations of the test results.

Tests:

Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
1	Degree of protection (IP code)			
1.1*	Verification of degree of protection (IP code) up to the degree IP 4X	SOP_EZ/1; ČSN EN 60529	Electrical equipment enclosures	A, B, C, D
1.2*	Verification of degree of protection (IP code) up to the degree IP 4X	SOP_EZ/1; ČSN EN IEC 61439-1 ed.3, cl. 10.3; ČSN EN IEC 61439-2 ed.3, cl. 10.3; ČSN EN 50123-6 ed.2, cl. 8.3.6	Switchboards and their functional parts	A, B, C, D
1.3*	Verification of degree of protection (IP code) up to the degree IP 4X	SOP_EZ/1; ČSN EN 62271-1 ed.2, cl. 7.7.1; ČSN EN IEC 62271-100 ed.3, cl. 7.7.1; ČSN EN IEC 62271-102 ed.2, cl. 7.7; ČSN EN 62271-103 ed.2, cl. 7.7; ČSN EN IEC 62271-200 ed.3, cl. 7.7.1; ČSN EN 62271-202 ed.3, cl. 7.7;	High voltage switchgear and controlgear	A, B, C, D
2	Temperature rise			
2.1*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; POM_EZ/1; POM_EZ/2	Electrical machines and instruments	A, B, C, D
2.2*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN 36 2255, cl. 176 to 192; POM_EZ/1; POM_EZ/2	Electrical equipment of driving vehicles	A, B, C, D
2.3*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN 60034-1 ed.2, cl. 8.3 to 8.10; POM_EZ/1; POM_EZ/2	Rotating electrical machines	A, B, C, D

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
2.4*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN 60077-1 ed.2, cl. 9.2.3, 9.3.2; ČSN EN 60077-2 ed.2, cl. 9.4.3, 9.3.3.3, 9.3.3.4, 9.3.3.8; ČSN EN IEC 60077-3 ed.2, cl. 9.3.3.4, 9.3.3.8; POM_EZ/1; POM_EZ/2	Electrical equipment of railway vehicles - Electrical components	A, B, C, D
2.5*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN 60076-2 ed.2; ČSN EN 60076-6, cl. 10.9.6; ČSN EN IEC 60076-11 ed.2, cl. 14.3.2; ČSN EN 60310 ed.3, cl. 10, 13.2.9 to 13.2.11, 13.3.6, 13.3.8; ČSN EN 50329, cl. 2.2.3; POM_EZ/1; POM_EZ/2	Transformers and their parts	A, B, C, D
2.6*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN 62271-1 ed.2, cl. 7.4, 7.5, 7.10.3, 8.4; ČSN EN IEC 62271-100 ed.3, cl. 7.4, 7.5, 7.10.3; ČSN EN IEC 62271-102 ed.2, cl. 7.4, 7.5, 8.4; ČSN EN 62271-103 ed.2, cl. 7.4, 7.5, 7.10.3; ČSN EN IEC 62271-200 ed.3, cl. 7.4, 7.5, 7.10.3, 8.4; ČSN EN 62271-202 ed.3, cl. 7.5; ČSN EN 60947-1 ed.5, cl. 9.3.3.3; ČSN EN 50123-1 ed.2, cl. 7.4; ČSN EN 50123-2 ed.2, cl. 8.3.4; ČSN EN 50123-3 ed.2, cl. 8.3.4; ČSN EN 50123-4 ed.2, cl. 8.3.4; ČSN EN 50123-6 ed.2, cl. 8.3.7; ČSN EN 50152-2 ed.3, cl. 7.1; POM_EZ/1; POM_EZ/2	Switchgear and controlgear and parts thereof	A, B, C, D

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2.7*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN 60146-1-1 ed.2, cl. 7.3.1, 7.3.2, 7.4.1, 7.4.2; ČSN EN 50328, cl. 4.2.2, 4.2.3, 4.2.4, 4.2.5; ČSN EN 61287-1 ed.2, cl. 4.5.3.13, 7.5.7; POM_EZ/1; POM_EZ/2	Semiconductor converters	A, B, C, D
2.8*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN IEC 60282-1 ed.4, cl. 7.5; ČSN 35 4701-2 ed.3, cl. 8.3; ČSN EN 60269-1 ed.3, cl. 8.3; POM_EZ/1; POM_EZ/2	Fuses	A, B, C, D
2.9*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN IEC 61439-1 ed.3, cl. 10.10; ČSN EN IEC 61439-2 ed.3, cl. 10.10; POM_EZ/1; POM_EZ/2	Switchboards	A, B, C, D
2.10*	Measurement of temperature-rise, temperature and losses	SOP_EZ/2; ČSN EN 50206-1 ed.2, cl. 6.13; POM_EZ/1; POM_EZ/2	Railway equipment - Rolling stock - Pantograph collectors	A, B, C, D
3	Mechanical and function testing			
3.1*	Test of making and breaking capacity, mechanical and functional tests, verification of strength	SOP_EZ/3; POM_EZ/2	Electrical machines and instruments	A, B, C, D
3.2*	Test of making and breaking capacity, mechanical and functional tests, verification of strength	SOP_EZ/3; ČSN 36 2255, cl. 153, 193 to 213; POM_EZ/2	Electrical equipment of driving vehicles	A, B, C, D
3.3*	Test of making and breaking capacity, mechanical and functional tests, verification of strength	SOP_EZ/3; ČSN 33 3525, cl. 5.6.2; POM_EZ/2	Metro traction lines	A, B, C, D

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
3.4*	Test of making and breaking capacity, mechanical and functional tests, verification of strength	SOP_EZ/3; ČSN EN 60077-1 ed.2, cl. 9.3.1, 9.3.4.1, 9.3.4.4, 9.3.8; ČSN EN 60077-2 ed.2, cl. 9.3.6, 9.3.7, 9.4.2, 9.3.3.2, 9.3.3.6, 9.3.4; ČSN EN IEC 60077-3 ed.2, cl. 9.3.3.2, 9.3.3.6, 9.3.4, 9.3.6, 9.3.7, 9.4.2; POM_EZ/2	Rolling stock electrical equipment	A, B, C, D
3.5*	Test of making and breaking capacity, mechanical and functional tests, verification of strength	SOP_EZ/3; ČSN EN IEC 60282-1 ed.4, cl. 7.6; POM_EZ/2	Fuses	A, B, C, D
3.6*	Test of making and breaking capacity, mechanical and functional tests, verification of strength	SOP_EZ/3; ČSN EN 60947-1 ed.5, cl. 9.3.3.5, 9.3.3.6, 9.3.3.7, 9.3.4; ČSN EN 60947-3 ed.4, cl. 9.3.4, 9.3.5, 9.3.8, 9.5; ČSN EN 62271-1 ed.2, cl. 7.10.2, 7.10.3, 7.10.4; ČSN EN IEC 62271-100 ed.3, cl. 7.10.2, 7.10.3, 7.10.4, 7.101, 7.102, 7.103.2, 7.105, 7.106, 7.107; ČSN EN IEC 62271-102 ed.2, cl. 7.101, 7.102, 7.103, 7.104; ČSN EN 62271-103 ed.2, cl. 7.10.2, 7.10.3, 7.10.4, 7.10.5, 7.101, 7.102, 8.102; ČSN EN IEC 62271-200 ed.3, cl. 7.10.2, 7.4.3, 7.10.3, 7.10.4, 7.101, 7.102, 8.102; ČSN EN 50123-1 ed.2, cl. 7.3, 7.8; ČSN EN 50123-2 ed.2, cl. 8.3.2, 8.3.6, 8.3.7, 8.3.8; ČSN EN 50123-3 ed.2, cl. 8.3.2, 8.3.5, 8.3.6, 8.3.9; ČSN EN 50123-4 ed.2, cl. 8.3.2, 8.3.5, 8.3.6, 8.3.8; ČSN EN 50123-6 ed.2, cl. 8.3.5, 8.3.8; PNE 35 4212 ed.2, cl. 9.6; POM_EZ/2	Switchgear and controlgear	A, B, C, D

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
3.7*	Test of making and breaking capacity, mechanical and functional tests, verification of strength	SOP_EZ/3; ČSN EN IEC 61439-1 ed.3, cl. 10.2.8; ČSN EN IEC 61439-2 ed.3, cl. 10.2.8; POM_EZ/2	Switchboards	A, B, C, D
4	Short-circuit capacity			
4.1	Test of short-circuit capacity	SOP_EZ/4; POM_EZ/2	Electrical machines and instruments	A, B, C, D
4.2	Test of short-circuit capacity	SOP_EZ/4; ČSN 36 2255, cl. 214 to 219; POM_EZ/2	Electrical equipment of driving vehicles	A, B, C, D
4.3	Test of short-circuit capacity	SOP_EZ/4; ČSN EN 60077-2 ed.2, cl. 9.3.4.2; POM_EZ/2	Rolling stock electrical equipment	A, B, C, D
4.4	Test of short-circuit capacity	SOP_EZ/4; ČSN EN 50123-1 ed.2, cl. 7.6, 7.7; ČSN EN 50123-2 ed.2, cl. 8.3.9; ČSN EN 50123-3 ed.2, cl. 8.3.8; ČSN EN 50123-4 ed.2, cl. 8.3.1.2, 8.3.9; ČSN EN 50123-6 ed.2, cl. 8.3.4; ČSN EN 50152-2 ed.3, cl. 7.1; ČSN EN 62271-1 ed.2, cl. 7.6, 7.10.3; ČSN EN IEC 62271-100 ed.3, cl. 7.6, 7.10.3; ČSN EN IEC 62271-102 ed.2, cl. 7.6; ČSN EN 62271-103 ed.2, cl. 7.6, 7.10.3; ČSN EN IEC 62271-200 ed.3, cl. 7.6, 7.10.3, 7.105; ČSN EN 62271-202 ed.3, cl. 7.6, 7.102, Annex A; ČSN EN 60947-1 ed.5, cl. 9.3.4; ČSN EN 60947-3 ed.4, cl. 9.3.6, 9.3.7; POM_EZ/2	Switchgear and controlgear	A, B, C, D
4.5	Test of short-circuit capacity	SOP_EZ/4; ČSN EN 50119 ed.3, cl. 8.11.1.3, 8.11.2; POM_EZ/2	Fixed traction equipment - Overhead contact lines for electric traction	A, B, C, D

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
4.6	Test of short-circuit capacity	SOP_EZ/4; ČSN EN IEC 61439-1 ed.3, cl. 10.5, 10.11; ČSN EN IEC 61439-2 ed.3, cl. 10.5, 10.11; POM_EZ/2	Switchboards	A, B, C, D
4.7	Test of short-circuit capacity	SOP_EZ/4; ČSN EN 61643-11 ed.2, cl. 8.3.5.3, 8.3.8.2; POM_EZ/2	Low voltage surge protections	A, B, C, D
4.8	Test of short-circuit capacity	SOP_EZ/4; ČSN EN 50328, cl. 4.2.9; POM_EZ/2	Semiconductor converters	A, B, C, D
4.9	Test of short-circuit capacity	SOP_EZ/4; ČSN EN 60076-5 ed.2; ČSN EN IEC 60076-11 ed.2, cl. 14.4.3; ČSN EN 60076-6, cl. 11.8.13; ČSN EN 60310 ed.3, cl. 13.2.15, 13.3.12; ČSN EN 61869-2, cl. 7.2.201; ČSN EN 60076-13, cl. 12.4.9; POM_EZ/2	Transformers and their parts	A, B, C, D
4.10	Test of short-circuit capacity	SOP_EZ/4; ČSN 35 4701-2 ed.3, cl. 8.5.5.1; POM_EZ/2	Fuses	A, B, C, D
5	Ventilation and hydraulic quantities			
5.1*	Measurement of ventilation and hydraulic quantities	SOP_EZ/5; ČSN ISO 7194:1994; POM_EZ/2	Equipment with flowing or pressure liquid	A, B, C, D
5.2*	Measurement of ventilation and hydraulic quantities	SOP_EZ/5; ČSN 12 3061, cl. 28 to 36, 44 to 51, 65 to 84, 110 to 115; POM_EZ/2	Fans	A, B, C, D
5.3*	Measurement of ventilation and hydraulic quantities	SOP_EZ/5; ČSN EN 61287-1 ed.2, cl. 4.5.3.5.2, 4.5.3.5.3; POM_EZ/2	Semiconductor converters	A, B, C, D

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
6	Dielectric tests			
6.1*	Dielectric tests	SOP_EZ/6; ČSN EN 60060-1; ČSN EN 60060-2 ed.2; ČSN EN 60270; ČSN EN 60052; ČSN EN 61083-1 ed.2; ČSN EN 61083-2 ed.2; ČSN EN 50124-1 ed.2, cl. 7.3, 7.4, 7.5, Annex A, B, C, D; ČSN EN IEC 61133, cl. 8.7; POM_EZ/2	Electrical machines, instruments	A, B, C, D
6.2*	Dielectric tests	SOP_EZ/6; ČSN EN 60076-3 ed.2; ČSN EN 60076-4; ČSN EN IEC 60076-11 ed.2, cl. 14.2.5, 14.2.6, 14.3.1, 14.2.7, 14.4.1; ČSN EN 60310 ed.3, cl. 13.2.12, 13.2.13, 13.2.14, 13.3.9, 13.3.10, 13.3.11; POM_EZ/2	Transformers and their parts	A, B, C, D
6.3*	Dielectric tests	SOP_EZ/6; ČSN 36 2255, cl. 220 to 233; POM_EZ/2	Electrical equipment of driving vehicles	A, B, C, D
6.4*	Dielectric tests	SOP_EZ/6; ČSN EN 62271-1 ed.2, cl. 7.2, 7.10.5, 8.2, 8.3.4; ČSN EN IEC 62271-100 ed.3, cl. 7.2; ČSN EN IEC 62271-102 ed.2, cl. 7.2, 8.2, 8.3; ČSN EN 62271-103 ed.2, cl. 7.2, 7.10.5; ČSN EN IEC 62271-200 ed.3, cl. 7.2, 7.10.5, 7.10.4, 8.2, 8.3.4; ČSN EN 62271-202 ed.3, cl. 7.2, 8.2, 8.3.4; ČSN EN 60947-1 ed.5, cl. 9.3.3.4; ČSN EN 50123-1 ed.2, cl. 7.5; ČSN EN 50123-2 ed.2, cl. 8.3.3; ČSN EN 50123-3 ed.2, cl. 8.3.3; ČSN EN 50123-4 ed.2, cl. 8.3.3; ČSN EN 50123-6 ed.2, cl. 8.3.3;	Switchgear and controlgear	A, B, C, D

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
		ČSN EN 50152-2 ed.3, cl. 7.2; PNE 35 4212, cl. 9.1, 9.2; POM_EZ/2		
6.5*	Dielectric tests	SOP_EZ/6; ČSN EN IEC 61439-1 ed.3, cl. 10.9, 11.9; ČSN EN IEC 61439-2 ed.3, cl. 10.9, 11.9; POM_EZ/2	Switchboards	A, B, C, D
6.6*	Dielectric tests	SOP_EZ/6; ČSN EN 60077-1 ed.2, cl. 9.3.3; ČSN EN 60077-2 ed.2, cl. 9.3.3.5, 9.4.5, 9.3.3.7, 9.3.5.5; ČSN EN IEC 60077-3 ed.2, cl. 9.3.3.5, 9.3.3.7, 9.3.4.8, 9.3.5.6, 9.4.6; POM_EZ/2	Rolling stock electrical equipment	A, B, C, D
6.7*	Dielectric tests	SOP_EZ/6; ČSN EN 60146-1-1 ed.2, cl. 7.2; ČSN EN 50328, cl. 4.2.1; ČSN EN 61287-1 ed.2, cl. 4.5.3.7, 4.5.3.8; POM_EZ/2	Semiconductor converters	A, B, C, D
6.8*	Dielectric tests	SOP_EZ/6; ČSN EN IEC 60282-1 ed.4, cl. 5.2.4, 7.4; POM_EZ/2	Fuses	A, B, C, D
7	Basic characteristics (dimensions, weight, circuit layout and component fitting)			
7.1*	Verification of dimensions, weights, circuit layout and component fitting according to technical documentation	SOP_EZ/7; POM_EZ/2	Electrical machines, instruments	A, B, C, D
7.2*	Verification of dimensions, weights, circuit layout and component fitting according to technical documentation	SOP_EZ/7; ČSN EN 60077-1 ed.2, cl. 9.2.3; POM_EZ/2	Rolling stock electrical equipment	A, B, C, D

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Ordinal number ¹	Test procedure / method name	Test procedure / method identification ²	Tested subject	Degrees of freedom ³
7.3*	Verification of dimensions, weights, circuit layout and component fitting according to technical documentation	SOP_EZ/7; ČSN EN 62271-1 ed.2, cl. 8.6; ČSN EN 50123-3 ed.2, cl. 8.3.1; POM_EZ/2	Switchgear and controlgear	A, B, C, D
8*	Electrical quantities			
8.1*	Measurement of electrical quantities (voltage, current, frequency, power, impedance, resistance, reactance, inductance, capacitance, phase shift, power factor, loss factor, time constant)	SOP_EZ/8; ČSN 42 0475; POM_EZ/2	Electrical machines, instruments	A, B, C, D
8.2*	Measurement of electrical quantities (voltage, current, frequency, power, impedance, resistance, reactance, inductance, capacitance, phase shift, power factor, loss factor, time constant)	SOP_EZ/8; ČSN EN 60076-1, cl. 11.2, 11.3, 11.4, 11.5; ČSN EN 60076-6, cl. 12.8.5; ČSN EN IEC 60076-11 ed.2, cl. 14.2.1, 14.2.2, 14.2.3, 14.2.4; ČSN EN 60310 ed.3, cl. 13.2.5 to 13.2.8, 13.3.5, 13.3.7; POM_EZ/2	Transformers	A, B, C, D

¹ asterisk at the ordinal number identifies the tests, which the laboratory is qualified to carry out outside the permanent laboratory premises

² if the document identifying the test procedure is dated, only these specific procedures are used. If the document identifying the test procedure is not dated, the latest valid edition of the specified procedure is used (including any changes)

³ degrees of freedom: A – Flexibility concerning materials/products (subject of the test), B – Flexibility concerning components/parameters/characteristics, C – Flexibility concerning the performance of the method, D – Flexibility concerning the method

The laboratory can modify the test procedures with the specified degree(s) of freedom in the scope of accreditation while maintaining the principle of measurement. If no degree of freedom is specified, the laboratory cannot apply a flexible approach to the scope of accreditation for the test.

Explanations:

SOP - Standard Operating Procedure

POM - Working procedure of the method

PNE - Energy Industry Company Standard

"This document is an appendix to the certificate of accreditation. In case of any discrepancies between the English and Czech versions, the Czech version shall prevail, both for the certificate appendix and the certificate itself."