



TURKISH ACCREDITATION AGENCY

# ACCREDITATION CERTIFICATE

As a Testing Laboratory

## ELTAŞ TRANSFORMATÖR SANAYİ VE TİCARET ANONİM ŞİRKETİ

Central Address: ELTAŞ TRANSFORMATÖR ALOSBI Çoraklar Mah. 5011 Sok. No:05 35800 Aliağa / İZMİR İzmir/Türkiye

is accredited in accordance with TS EN ISO/IEC 17025:2017 standard within the scope given in Annex following the assessment conducted by TURKAK.

**Accreditation Number : AB-0347-T**

**Accreditation Date : 25.03.2010**

**Revision Date / Number : 22.09.2022 / 12**


This certificate shall remain in force until **22.09.2026**, subject to continuing compliance with the standard **TS EN ISO/IEC 17025:2017**, related regulations and requirements.

Gülden Banu Müderrisoğlu  
Secretary General



Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA) in the scope of ISO/IEC 17025.



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|  <p>Test<br/>TS EN ISO/IEC 17025<br/>AB-0347-T</p> | <b>ELTAŞ TRANSFORMATÖR SANAYİ VE TİCARET ANONİM ŞİRKETİ</b>     |  |
|   | Accreditation Nr: AB-0347-T<br>Revision Nr: 12 Date: 22.09.2022 |  |
| <b>Testing Laboratory</b>   |   |  |
| Address :<br>ELTAŞ TRANSFORMATÖR ALOSBI Çoraklar Mah. 5011 Sok.<br>No:05 35800 Aliğa / İZMİR İzmir/Türkiye                          |   | Phone : +90 232 520 8250<br>Fax : +90 232 376 7764<br>Email : pelin.gonulay@eltas.com.tr<br>Website : www.eltas.com.tr |



Electrical, Electronic and IT Products and Devices

| Tested Materials / Products | Name of Test   | Testing Method (National, International Standards, In-house Methods)                   |
|-----------------------------|--|--|
| Power transformers          | Measurement of winding resistance                            | TS EN 60076-1 Madde 11.2<br>EN 60076-1 Clause 11.2<br>IEC 60076-1 Clause 11.2          |
| Transformers                | Measurement of winding resistance                            | IEEE C57.12.90 Clause 5  |
| Power transformers          | Measurement of winding resistance                            | TS EN 60076-11 Madde 14.2.1<br>EN 60076-11 Clause 14.2.1<br>IEC 60076-11 Clause 14.2.1 |
| Power Transformers          | Measurement of winding resistance                            | IEEE C57.12.91 Clause 5  |
| Power transformers          | Measurement of voltage ratio and check of phase displacement | TS EN 60076-1 Madde 11.3<br>EN 60076-1 Clause 11.3<br>IEC 60076-1 Clause 11.3          |
| Transformers                | Measurement of voltage ratio and check of phase displacement | IEEE C57.12.90 Clause 6-7  |
| Power transformers          | Measurement of voltage ratio and check of phase displacement | TS EN 60076-11 Madde 14.2.2<br>EN 60076-11 Clause 14.2.2<br>IEC 60076-11 Clause 14.2.2 |
| Power Transformers          | Measurement of voltage ratio and check of phase displacement | IEEE C57.12.91 Clause 7  |
| Power transformers          | Measurement of short-circuit impedance and load loss         | TS EN 60076-1 Madde 11.4<br>EN 60076-1 Clause 11.4<br>IEC 60076-1 Madde 11.4           |
| Transformers                | Measurement of short-circuit impedance and load loss         | IEEE C57.12.90 Madde 9   |
| Power transformers          | Measurement of short-circuit impedance and load loss         | TS EN 60076-11 Madde 14.2.3<br>EN 60076-11 Clause 14.2.3<br>IEC 60076-11 Clause 14.2.3 |
| Power Transformers          | Measurement of short-circuit impedance and load loss         | IEEE C57.12.91 Clause 9  |
| Power transformers          | Measurement of no-load loss and current                      | TS EN 60076-1 Madde 11.5<br>EN 60076-1 Clause 11.5<br>IEC 60076-1 Clause 11.5          |
| Transformers                | Measurement of no-load loss and current                      | IEEE C57.12.90 Clause 8  |
| Power transformers          | Measurement of no-load loss and current                      | TS EN 60076-11 Madde 14.2.4<br>EN 60076-11 Clause 14.2.4<br>IEC 60076-11 Clause 14.2.4 |





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|  |   | Phone : +90 232 520 8250<br>Fax : +90 232 376 7764<br>Email : pelin.gonulay@eltas.com.tr<br>Website : www.eltas.com.tr |
| Power Transformers   | Measurement of no-load loss and current   | IEEE C57.12.91 Clause 8  |
| Power transformers   | Measurement of zero-sequence impedance  | TS EN 60076-1 Madde 11.6<br>EN 60076-1 Clause 11.6<br>IEC 60076-1 Clause 11.6  |
| Transformers   | Measurement of zero-sequence impedance  | IEEE C57.12.90 Clause 9.5  |
| Power transformers   | Tests on on-load tap-changers, where appropriate  | TS EN 60076-1 Madde 11.7<br>EN 60076-1 Clause 11.7<br>IEC 60076-1 Clause 11.7  |
| Power transformers   | Leak testing with pressure for liquid immersed transformers (tightness test)  | TS EN 60076-1 Madde 11.8<br>EN 60076-1 Clause 11.8<br>IEC 60076-1 Clause 11.8  |
| Power transformers   | Check of the ratio and polarity of built-in current transformers  | TS EN 60076-1 Madde 11.1.2.1 (i)<br>EN 60076-1 Clause 11.1.2.1 (i)<br>IEC 60076-1 Clause 11.1.2.1 (i)                  |
| Power transformers   | Check of core and frame insulation for liquid immersed transformers with core or frame insulation   | TS EN 60076-1 Madde 11.12<br>EN 60076-1 Clause 11.12<br>IEC 60076-1 Clause 11.12                                       |
| Transformers   | Check of core and frame insulation for liquid immersed transformers with core or frame insulation   | IEEE C57.12.90 Clause 10.11  |
| Power transformers   | Determination of capacitances windings-to-earth and between windings  | TS EN 60076-1 Madde 11.1.2.2 (a)<br>EN 60076-1 Clause 11.1.2.2 (a)<br>IEC 60076-1 Clause 11.1.2.2 (a)                  |
| Transformers   | Determination of capacitances windings-to-earth and between windings  | IEEE C57.12.90 Clause 10.11  |
| Power transformers   | Measurement of insulation resistance  | TS EN 60076-1 Madde 11.1.2.2 (b)<br>EN 60076-1 Clause 11.1.2.2 (b)<br>IEC 60076-1 Clause 11.1.2.2 (b)                  |
| Transformers   | Measurement of insulation resistance  | IEEE C57.12.90 Clause 10.11  |
| Power transformers   | Measurement of dissipation factor (tan $\delta$ ) of the insulation system capacitances   | TS EN 60076-1 Madde 11.1.2.2 (c)<br>EN 60076-1 Clause 11.1.2.2(c)<br>IEC 60076-1 Clause 11.1.2.2(c)                    |
| Transformers   | Measurement of dissipation factor (tan $\delta$ ) of the insulation system capacitances   | IEEE C57.12.90 Clause 10.10  |
| Power transformers   | Measurement of no-load loss and current at 90 % and 110 % of rated voltage  | TS EN 60076-1 Madde 11.1.2.2 (e)<br>EN 60076-1 Clause 11.1.2.2 (e)<br>IEC 60076-1 Clause 11.1.2.2 (e)                  |
| Transformers   | Measurement of no-load loss and current at 90 % and 110 % of rated voltage  | IEEE C57.12.90 Clause 8.2  |





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| Power Transformers   | Measurement of no-load loss and current at 90 % and 110 % of rated voltage  | IEEE C57.12.91 Clause 8  |
| Power transformers   | Applied voltage test (AV)   | TS EN 60076-3 Madde 10<br>EN 60076-3 Clause 10<br>IEC 60076-3 Clause 10                |
| Transformers   | Applied voltage test (AV)   | IEEE C57.12.90 Clause 10.6   |
| Power Transformers   | Applied voltage test (AV)   | IEEE C57.12.91 Clause 10.3   |
| Power transformers   | Induced voltage withstand test (IVW)  | TS EN 60076-3<br>EN 60076-3<br>IEC 60076-3   |
| Transformers   | Induced voltage withstand test (IVW)  | IEEE C57.12.90 Clause 10.7   |
| Power Transformers   | Induced voltage withstand test (IVW)  | IEEE C57.12.91 Clause 10.4   |
| Power transformers   | Partial discharge measurement   | TS EN 60076-11 Madde 14.2.7<br>EN 60076-11 Clause 14.2.7<br>IEC 60076-11 Clause 14.2.7 |
| Power transformers   | Partial discharge measurement   | TS EN 60076-16 Madde 9.2.4<br>EN 60076-16 Clause 9.2.4<br>IEC 60076-16 Clause 9.2.4    |
| Power transformers   | Partial discharge measurement   | TS EN 60076-3 Ek-A<br>EN 60076-3 Ek-A<br>IEC 60076-3 Ek-A                              |
| Power transformers   | Induced voltage test with partial discharge measurement (IVPD)  | TS EN 60076-3 Madde 11.3<br>EN 60076-3 Clause 11.3<br>IEC 60076-3 Clause 11.3          |
| Transformers   | Induced voltage test with partial discharge measurement (IVPD)  | IEEE C57.12.90 Clause 10.8   |
| Power transformers   | Line terminal AC withstand test (LTAC)  | TS EN 60076-3 Madde 12<br>EN 60076-3 Clause 12<br>IEC 60076-3 Clause 12                |
| Power transformers   | Full wave lightning impulse test (LI)   | TS EN 60076-3 Madde 13.2<br>EN 60076-3 Clause 13.2<br>IEC 60076-3 Clause 13.2          |
| Power transformers   | Full wave lightning impulse test (LI)   | TS EN 60076-11 Madde 14.3.1<br>EN 60076-11 Clause 14.3.1<br>IEC 60076-11 Clause 14.3.1 |
| Power transformers   | Full wave lightning impulse test (LI)   | TS EN 60076-16 Madde 9.2.3<br>EN 60076-16 Clause 9.2.3<br>IEC 60076-16 Clause 9.2.3    |



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| Transformers   | Full wave lightning impulse test (LI)  | IEEE C57.12.90 Clause 10.3.1.1  |
| Power Transformers   | Full wave lightning impulse test (LI)  | IEEE C57.12.91 Clause 10.5  |
| Power transformers   | Chopped wave lightning impulse test (LIC)  | TS EN 60076-3 Madde 13.3<br>EN 60076-3 Clause 13.3<br>IEC 60076-3 Clause 13.3                   |
| Power transformers   | Chopped wave lightning impulse test (LIC)  | TS EN 60076-16 Madde 9.2.2<br>EN 60076-16 Madde 9.2.2<br>IEC 60076-16 Clause 9.2.2              |
| Transformers   | Chopped wave lightning impulse test (LIC)  | IEEE C57.12.90 Clause 10.3.1.3  |
| Power Transformers   | Chopped wave lightning impulse test (LIC)  | IEEE C57.12.91 Clause 10.5  |
| Power transformers   | Lightning impulse test on a neutral terminal (LIN)   | TS EN 60076-3 Madde 13.4<br>EN 60076-3 Clause 13.4<br>IEC 60076-3 Clause 13.4                   |
| Transformers   | Lightning impulse test on a neutral terminal (LIN)   | IEEE C57.12.90 Clause 10.3.3  |
| Power Transformers   | Lightning impulse test on a neutral terminal (LIN)   | IEEE C57.12.91 Clause 10.6  |
| Power transformers   | Switching impulse test (SI)  | TS EN 60076-3 Madde 14<br>EN 60076-3 Clause 14<br>IEC 60076-3 Clause 14                         |
| Transformers   | Switching impulse test (SI)  | IEEE C57.12.90 Clause 10.2  |
| Power transformers   | Temperature rise type test   | TS EN 60076-2<br>EN 60076-2<br>IEC 60076-2  |
| Transformers   | Temperature rise type test   | IEEE C57.12.90 Clause 11  |
| Power transformers   | Temperature rise type test   | TS EN 60076-11 Madde 14.3.2<br>EN 60076-11 Clause 14.3.2<br>IEC 60076-11 Clause 14.3.2          |
| Power Transformers   | Temperature rise type test   | IEEE C57.12.91 Clause 11  |
| Power transformers   | Measurement of frequency response analysis (FRA)   | TS EN 60076-1 Madde 11.1.4 (I)<br>EN 60076-1 Clause 11.1.4 (I)<br>IEC 60076-1 Clause 11.1.4 (I) |
| Power transformers   | Determination of sound level for each method of cooling for which a guaranteed sound level is specified  | TS EN 60076-10<br>EN 60076-10<br>IEC 60076-10   |



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| Transformers   | Determination of sound level for each method of cooling for which a guaranteed sound level is specified                                     | IEEE C57.12.90 Clause 13  |
| Power transformers   | Determination of sound level for each method of cooling for which a guaranteed sound level is specified                                     | TS EN 60076-11 Madde 14.4.2<br>EN 60076-11 Clause 14.4.2<br>IEC 60076-11 Clause 14.4.2  |
| Power Transformers   | Determination of sound level for each method of cooling for which a guaranteed sound level is specified                                     | IEEE C57.12.91 Clause 3   |
| Medium power transformers  | Special test for corrugated tank  | TS EN 50588-1<br>EN 50588-1<br><br>(* It was abolished on 09.11.2020, but it was included in the scope of accreditation for a temporary period based on the request of the organization.)   |
| Power transformers   | Measurement of the power taken by the fan and liquid pump motors  | TS EN 60076-1 Madde 11.1.3 (d)<br>EN 60076-1 Clause 11.1.3 (d)<br>IEC 60076-1 Clause 11.1.3 (d)   |
| Power transformers   | Winding hot-spot temperature-rise measurements  | TS EN 60076-1 Madde 11.1.4(b)<br>EN 60076-1 Clause 11.1.4 (b)<br>IEC 60076-1 Clause 11.1.4 (b)  |
| Power transformers   | Determination of transient voltage transfer characteristics (IEC60076-3:2000 Annex B)   | TS EN 60076-1 Madde 11.1.4 (e)<br>EN 60076-1 Clause 11.1.4 (e)<br>IEC 60076-1 Clause 11.1.4 (e)   |
| Power transformers   | Check of external coating (ISO 2178 and ISO 2409 or as specified)   | TS EN 60076-1 Madde 11.1.4 (m)<br>EN 60076-1 Clause 11.1.4 (m)<br>IEC 60076-1 Clause 11.1.4 (m)   |
| Power transformers   | <b>Measurement of the harmonics of the no-load current</b>  | TS 267 EN 60076-1:1998 Article 10.6 (Cancelled Standard)<br>IEC 60076-1:2000 Clause 10.6 (Cancelled Standard)<br><br>(Repealed on 12.04.2012, but included in the scope of accreditation for a temporary period upon the request of the institution.) |
| Power Transformers   | <b>Dielectric frequency response (DFR)</b>  | IEEE Std. C57.152 Annex G<br>IEEE Std. C57.161  |
| Power transformers   | <b>Insulation of auxiliary wiring (AuxW)</b>  | TS EN 60076-3 Madde 9<br>EN 60076-3 Clause 9<br>IEC 60076-3 Clause 9  |
| Mineral insulating oils  | Appearance  | TS EN 60422<br>EN 60422<br>IEC 60422  |

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Accreditation Nr: AB-0347-T  
Revision Nr: 12 Date: 22.09.2022

### Lubricants

| Tested Materials / Products | Name of Test   | Testing Method (National, International Standards, In-house Methods)   |
|-----------------------------|--|--|
| Transformer insulating oils | Dissolved Gas Analysis (ÇGA) (H <sub>2</sub> , CH <sub>4</sub> , CO, CO <sub>2</sub> , C <sub>2</sub> H <sub>4</sub> , C <sub>2</sub> H <sub>6</sub> , C <sub>3</sub> H <sub>8</sub> , C <sub>3</sub> H <sub>6</sub> , C <sub>2</sub> H <sub>2</sub> ) and Free Gas Analysis (N <sub>2</sub> , O <sub>2</sub> )<br>Gas Chromatography Method | TS EN 60567<br>ASTM D 3612   |
| Transformer insulating oils | Determination of Power Factor  | TS EN 60247<br>IEC 60247<br>ASTM D 924<br>ASTM D 1169                  |
| Transformer insulating oils | Determination of breakdown voltage   | TS 3989 EN 60156<br>IEC 60156<br>ASTM D 1816<br>ASTM D 877<br>VDE-0370 |
| Transformer insulating oils | Determination of Water Amount<br>Coulometric Karl Fischer Titration Method   | TS EN 60814<br>IEC 60814<br>ASTM D 1533                                |
| Transformer insulating oils | Determination of Acidity Amount<br>Automatic Potentiometric Titration Method   | TS EN 62021-1<br>IEC 62021-1   |
| Transformer insulating oils | Determination of Interfacial Tension   | ASTM D 971   |
| Transformer insulating oils | ASTM Color Determination   | ASTM D 1500  |
| Transformer insulating oils | Density Determination<br>Oscillating U-Tube Method   | TS EN ISO 12185<br>ISO 12185<br>ASTM D 1298                            |
| Transformer insulating oils | Determination of Kinematic Viscosity and Calculation of Dynamic Viscosity  | ASTM D 445   |
| Transformer insulating oils | Determination of Aniline Point   | ASTM D 611   |

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