



TURKISH ACCREDITATION AGENCY

## ACCREDITATION CERTIFICATE

As a Calibration Laboratory,

**TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON  
LABORATUVARI**

Sanayi Mahallesi Havaalanı İç Yolu Caddesi Sabiha Gökçen  
Havaalanı E Kapısı No:3 34912 Pendik İstanbul Türkiye  
ISTANBUL / TURKEY

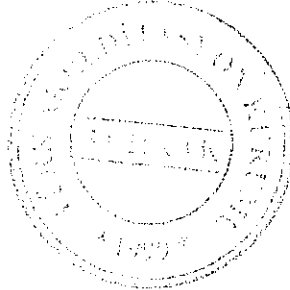
is accredited in accordance with TS EN ISO/IEC 17025:2017 standard within the scope given in Annex following the assessment conducted by **TURKAK**.

**Accreditation Number** : AB-0092-K

**Accreditation Date** : 03 February 2012

**Revision Date / Number** : 07 February 2020 / 09


This certificate shall remain in force until **09 February 2024**, subject to continuing compliance with the standard **TS EN ISO/IEC 17025:2017**, related regulations and requirements.



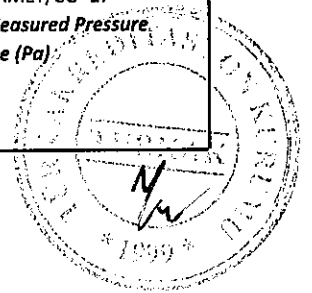
**G. Banu MÜDERRİSOĞLU**  
Secretary General

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.

**Annex of the certificate ( Page 1/24)  
Accreditation Scope**

 <b>Kalibrasyon</b> <b>TS EN ISO IEC 17025</b> <b>AB-0092-K</b>	<b>TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI</b>	
	<b>Accreditation Nr: AB-0092-K</b> <b>Revision Nr: 09 Date: 03.03.2020</b>	
<b>As a Calibration Laboratory</b>		
<b>Address :</b> Sanayi Mahallesi Havaalanı İç Yolu Caddesi Sabiha Gökçen Havaalanı E Kapısı No:3 34912 Pendik İstanbul Türkiye İSTANBUL/TÜRKİYE	<b>Phone :</b> 90 (216) 585 98 00 <b>Fax :</b> 90 (216) 585 98 18 <b>E-mail :</b> kalibrasyon@thy.com <b>Website :</b>	

Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
<b>TORQUE</b> Torque Hand Tools	0,04 N·m ≤ M ≤ 1350 N·m	CW & CCW	1 %	Calibration procedure in accordance with TS EN ISO 6789 <b>M: Measured Torque Value</b>
<b>PRESSURE</b> Relative Pressure Analog and Digital Display Manometers Pressure Transducer and Transmitter	3 kPa ≤ p ≤ 3,5 MPa 0,1 MPa < p ≤ 3,5 MPa 3,5 MPa ≤ p ≤ 70 MPa	Pneumatic (with DWT) Hydraulic (with DWT) Hydraulic (with DWT)	16 · 10 <sup>-5</sup> · p + 72 Pa 17 · 10 <sup>-5</sup> · p + 60 Pa 18 · 10 <sup>-5</sup> · p + 0,47 kPa	Calibration procedure in accordance with EURAMET/CG- 17 <b>p: Measured Pressure Value (Pa)</b>
Negative Relative Pressure (Vacuum) Analog and Digital Display Manometers Pressure Transducer and Transmitter	- 90 kPa ≤ p ≤ - 10 kPa	Pneumatic Vacuum (with DWT)	6 Pa + 14 · 10 <sup>-5</sup> · p	Calibration procedure in accordance with EURAMET/CG- 17 <b>p: Measured Pressure Value (Pa)</b>
Absolute Pressure Analog and Digital Display Manometers Pressure Transmitter and Transducer Air Data Test Set	10 kPa ≤ p ≤ 350 kPa	Pneumatic (with RPM4)	4.3 · 10 <sup>-5</sup> · p + 0,13 kPa	Calibration procedure in accordance with EURAMET/CG- 17 <b>p: Measured Pressure Value (Pa)</b>
Absolute Pressure Analog and Digital Display Manometers Pressure Transmitter and Transducer	350 kPa ≤ p ≤ 3,5 MPa 3,5 MPa ≤ p ≤ 70 MPa	Pneumatic Hydraulic	36 · 10 <sup>-5</sup> · p + 0,2 kPa 37 · 10 <sup>-5</sup> · p + 0,1 kPa	Calibration procedure in accordance with EURAMET/CG- 17 <b>p: Measured Pressure Value (Pa)</b>



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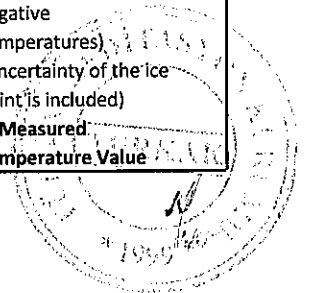
Kalibrasyon  
TS EN ISO IEC 17025  
AB-0092-K

TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI

Accreditation Nr: AB-0092-K


Revision Nr: 09 Date: 03.03.2020

Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Absolute Pressure Analog and Digital Display Barometers	750 hPa ≤ p ≤ 1100 hPa	Barometric Chamber (with RPM4)	1.6 hPa	Calibration procedure in accordance with EURAMET/CG-17 <b>p: Measured Pressure Value (Pa)</b>
TEMPERATURE Temperature Meter with Display	-40 °C ≤ T ≤ 70 °C	Climatic Chamber	0.58 °C	Comparative Method (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>
	-25 °C ≤ T ≤ 150 °C	Liquid Bath	0.05 °C	Comparative Method (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>
	-95 °C ≤ T < 140 °C 140 °C ≤ T < 650 °C	Block Calibrator Block Calibrator	0.03 °C 0.1 °C	Comparative Method (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>
	650 °C ≤ T ≤ 1100 °C	Block Calibrator	1.2 °C	Comparative Method (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>
Resistance Thermometers Platinum Resistance Thermometers (PRT)	-25 °C ≤ T ≤ 250 °C	Liquid Bath	0.05 °C	Comparative Method (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>
	-95 °C ≤ T ≤ 140 °C 140 °C ≤ T ≤ 650 °C	Block Calibrator Block Calibrator	0.03 °C 0.1 °C	Comparative Method (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>
Thermocouple	-40 °C ≤ T ≤ 70 °C	Climatic Chamber	0.66 °C	For K, J, E, T, R, S, N, U Types (Excluded Type B at negative Temperatures) (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>

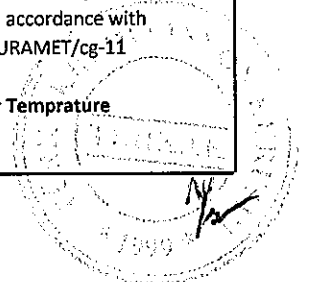


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Accreditation Scope


 <p>Kalibrasyon TS EN ISO IEC 17025 AB-0092-K</p>	<p><b>TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI</b></p> <p>Accreditation Nr: AB-0092-K Revision Nr: 09 Date: 03.03.2020</p>
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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
(Thermocouple Devam)	$-25\text{ °C} \leq T \leq 150\text{ °C}$	Liquid Bath	0.33 °C	For K, J, E, T, R, S, N, U Types (Excluded Type B at negative Temperatures) (Uncertainty of the ice point is included)* <b>T: Measured Temperature Value</b>
	$-95\text{ °C} \leq T \leq 140\text{ °C}$	Block Calibrator	0.1 °C	For K, J, E, T, R, S, N, U Types (Excluded Type B at negative Temperatures) (Uncertainty of the ice point is included) <b>T: Measured Temperature Value</b>
	$140\text{ °C} \leq T \leq 650\text{ °C}$	Block Calibrator	0.44 °C	
$650\text{ °C} \leq T \leq 1100\text{ °C}$	Block Calibrator	1.3 °C		
Block Calibrator	$-40\text{ °C} \leq T \leq 650\text{ °C}$	Stability and temperature distribution measurement	1.1 °C	Calibration procedure in accordance with EURAMET /cg-13 <b>T: Measured Temperature Value</b>
	$650\text{ °C} \leq T \leq 1100\text{ °C}$	Stability and temperature distribution measurement	1.4 °C	Calibration procedure in accordance with EURAMET /cg-13 <b>T: Measured Temperature Value</b>
Temperature controlled enclosures  (Chambers, Environmental Cabinets, Deep Freeze, cold chamber Furnaces and Ovens)  (Liquid Baths)	$-40\text{ °C} \leq T \leq 90\text{ °C}$	Climatic Chamber	1.8 °C	Calibration procedure in accordance with Dakks DKD-R 5-7, Euramet cg-20, EN 60068-3-5, EN 60068-3-11 <b>T: Temperature</b>
	$90\text{ °C} \leq T \leq 150\text{ °C}$	Climatic Chamber	3.1 °C	
	$150\text{ °C} \leq T \leq 800\text{ °C}$	Climatic Chamber	4.1 °C	
	$-25\text{ °C} \leq T \leq 280\text{ °C}$	Liquid Bath	0.05 °C	
Temperature indicators and simulators  Temperature indicators K Type	$-200\text{ °C} \leq T \leq 1372\text{ °C}$	CJC ON	0.12 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>

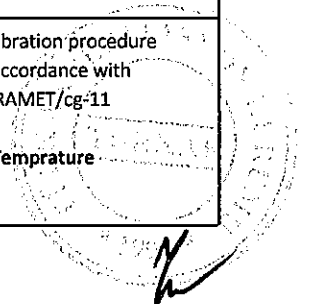


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Accreditation Scope


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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Temperature indicators and simulators  Temperature indicators T Type	$-250\text{ °C} \leq T \leq 400\text{ °C}$	CJC ON	0.16 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>
Temperature indicators and simulators  Temperature indicators J Type	$-200\text{ °C} \leq T \leq 1200\text{ °C}$	CJC ON	0.13 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>
Temperature indicators and simulators  Temperature indicators E Type	$-250\text{ °C} \leq T \leq 1000\text{ °C}$	CJC ON	0.12 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>
Temperature indicators and simulators  Temperature indicators S Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC ON	0.60 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>
Temperature indicators and simulators  Temperature indicators R Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC ON	0.61 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>
Temperature indicators and simulators  Temperature indicators N Type	$-200\text{ °C} \leq T \leq 1300\text{ °C}$	CJC ON	0.16 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>
Temperature indicators and simulators  Temperature indicators K Type	$-200\text{ °C} \leq T \leq 1372\text{ °C}$	CJC OFF	0.11 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>



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## Accreditation Scope

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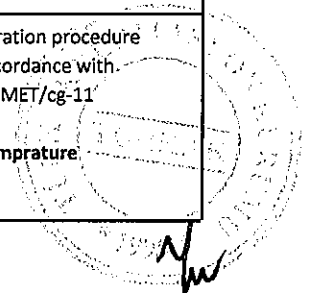
Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Temperature indicators and simulators  Temperature indicators T Type	$-250\text{ °C} \leq T \leq 400\text{ °C}$	CJC OFF	0.15 °C	Calibration procedure in accordance with EURAMET/cg-11  T: Temperature
Temperature indicators and simulators  Temperature indicators J Type	$-200\text{ °C} \leq T \leq 1200\text{ °C}$	CJC OFF	0.10 °C	Calibration procedure in accordance with EURAMET/cg-11  T: Temperature
Temperature indicators and simulators  Temperature indicators E Type	$-250\text{ °C} \leq T \leq 1000\text{ °C}$	CJC OFF	0.10 °C	Calibration procedure in accordance with EURAMET/cg-11  T: Temperature
Temperature indicators and simulators  Temperature indicators S Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC OFF	0.60 °C	Calibration procedure in accordance with EURAMET/cg-11  T: Temperature
Temperature indicators and simulators  Temperature indicators R Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC OFF	0.61 °C	Calibration procedure in accordance with EURAMET/cg-11  T: Temperature
Temperature indicators and simulators  Temperature indicators N Type	$-200\text{ °C} \leq T \leq 1300\text{ °C}$	CJC OFF	0.15 °C	Calibration procedure in accordance with EURAMET/cg-11  T: Temperature
Temperature indicators and simulators  Temperature indicators PRT ( PT 100 etc.)	$-200\text{ °C} \leq T \leq 800\text{ °C}$		0.24 °C	Calibration procedure in accordance with EURAMET/cg-11  T: Temperature

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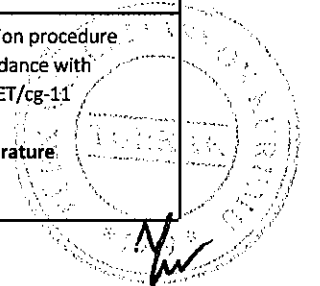
Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Temperature indicators and simulators Temperature Simulators K Type	$-200\text{ °C} \leq T \leq 1372\text{ °C}$	CJC ON	0.15 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators T Type	$-250\text{ °C} \leq T \leq 400\text{ °C}$	CJC ON	0.21 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators J Type	$-210\text{ °C} \leq T \leq 1200\text{ °C}$	CJC ON	0.19 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators E Type	$-250\text{ °C} \leq T \leq 1000\text{ °C}$	CJC ON	0.14 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators S Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC ON	0.49 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators R Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC ON	0.47 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators N Type	$-200\text{ °C} \leq T \leq 1300\text{ °C}$	CJC ON	0.16 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>



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**Accreditation Scope**

 Kalibrasyon TS EN ISO IEC 17025 AB-0092-K	<b>TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI</b>  Accreditation Nr: AB-0092-K Revision Nr: 09 Date: 03.03.2020
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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Temperature indicators and simulators Temperature Simulators K Type	$-200\text{ °C} \leq T \leq 1372\text{ °C}$	CJC OFF	0.14 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators T Type	$-250\text{ °C} \leq T \leq 400\text{ °C}$	CJC OFF	0.18 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators J Type	$-210\text{ °C} \leq T \leq 1200\text{ °C}$	CJC OFF	0.13 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators E Type	$-250\text{ °C} \leq T \leq 1000\text{ °C}$	CJC OFF	0.13 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators S Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC OFF	0.47 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators R Type	$0\text{ °C} \leq T \leq 1767\text{ °C}$	CJC OFF	0.47 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>
Temperature indicators and simulators Temperature Simulators N Type	$-200\text{ °C} \leq T \leq 1300\text{ °C}$	CJC OFF	0.16 °C	Calibration procedure in accordance with EURAMET/cg-11 <b>T: Temperature</b>



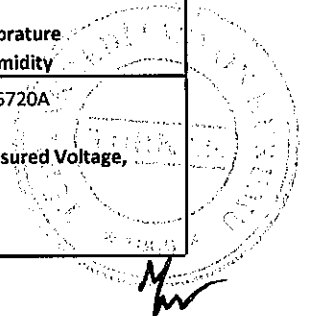


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Accreditation Scope


 Kalibrasyon TS EN ISO IEC 17025 AB-0092-K	<b>TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI</b>  Accreditation Nr: AB-0092-K Revision Nr: 09 Date: 03.03.2020
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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Temperature indicators and simulators  Temperature Simulators PRT ( PT 100 etc.)	-200 °C ≤ T ≤ 800 °C		0.16 °C	Calibration procedure in accordance with EURAMET/cg-11  <b>T: Temperature</b>
<b>RADIATION THERMOMETRY</b>  Industrial Radiation Thermometers  Pyrometer Thermal Camera Infrared Thermometer	- 25 °C ≤ T ≤ 100 °C 50 °C ≤ T ≤ 300 °C 300 °C ≤ T ≤ 500 °C 500 °C ≤ T ≤ 650 °C	with Liquid Bath  with IR Calibrator  with IR Calibrator  with IR Calibrator	0.6 °C 1.8 °C 2.8 °C 3.8 °C	Calibration procedure in accordance with VDI VDE DGQ 3511 ASTM E 2847, BS EN 12470-5 T: Measured Temperature Value
Tympanic Thermometer	34 °C ≤ T ≤ 42 °C	with Liquid Bath	0.15 °C	Calibration procedure in accordance with VDI VDE DGQ 3511 ASTM E 2847, BS EN 12470-5 T: Measured Temperature Value
<b>HUMIDITY</b> Hygrometers Analog and Digital Display Relative Hygrometers	30 %rh ≤ RH ≤ 95 %rh	Humidity and Temperature Cabinet 15 °C ≤ T ≤ 30 °C	2 %rh	Comparative Method  <b>RH: Measured Relative Humidity</b> <b>T: The Measurement Temperature</b>
Humidity Controlled Enclosures (Climatic Chambers, Relative Humidity Source, Autoclaves)	30 % rh ≤ RH ≤ 95 % rh	Central Relative Humidity Measurement (Single Point)  21 °C ≤ T ≤ 25 °C	2.1 % rh	Calibration procedure in accordance with Dakks DKD-R 5-7, Euramet cg-20, EN 60068-3-5, EN 60068-3-6, EN 60068-3-11  <b>T: Temperature</b> <b>RH: Humidity</b>
<b>ELECTRICAL</b> DC Voltage DC Voltage Meter Multimeter: DC Voltage	0 mV ≤ U < 200 mV 200 mV ≤ U < 2 V 2 V ≤ U ≤ 11 V 11 V < U ≤ 20 V 20 V < U ≤ 200 V 200 V < U ≤ 1000 V		7.8 · 10 <sup>-6</sup> · U + 0,47 μV 5.2 · 10 <sup>-6</sup> · U + 0,70 μV 3.6 · 10 <sup>-6</sup> · U + 4,4 μV 3.7 · 10 <sup>-6</sup> · U + 4,3 μV 5.2 · 10 <sup>-6</sup> · U + 43 μV 6.7 · 10 <sup>-6</sup> · U + 0,41 mV	FLUKE 5720A  <b>U: Measured Voltage, V</b>

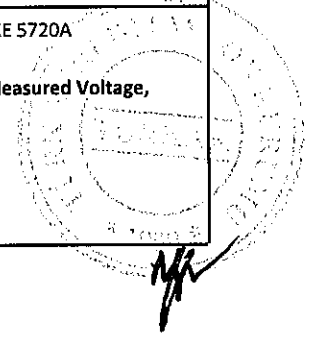


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Accreditation Scope

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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
DC Voltage DC Voltage Source Calibrator: DC Voltage	0 mV ≤ U < 199,99 mV 199,99 mV ≤ U ≤ 1,9999 V 1,9999 V < U ≤ 19,999 V 19,999 V < U ≤ 199,99 V 199,99 V < U ≤ 1000 V		4.8 · 10 <sup>-6</sup> · U + 0,15 μV 3.0 · 10 <sup>-6</sup> · U + 0,4 μV 3.0 · 10 <sup>-6</sup> · U + 3,9 μV 4.2 · 10 <sup>-6</sup> · U + 40 μV 4.3 · 10 <sup>-6</sup> · U + 0,49 mV	FLUKE 8508A  U: Measured Voltage, V
DC Current DC Current Meter Multimeter: DC Current	20 μA ≤ I ≤ 220 μA 220 μA < I ≤ 2,2 mA 2,2 mA < I ≤ 22 mA 22 mA < I ≤ 220 mA 220 mA < I ≤ 2,2 A  2,2 A < I ≤ 10 A 10 A < I ≤ 20 A		41 · 10 <sup>-6</sup> · I + 6 nA 37 · 10 <sup>-6</sup> · I + 7 nA 37 · 10 <sup>-6</sup> · I + 40 nA 47 · 10 <sup>-6</sup> · I + 0,7 μA 81 · 10 <sup>-6</sup> · I + 12 μA  0.40 · 10 <sup>-3</sup> · I + 0,4 mA 0.78 · 10 <sup>-3</sup> · I + 0,6 mA	FLUKE 5720A  I: Measured Current, A  FLUKE 5522A I: Measured Current, A
DC Current Meter, Clampmeter Pensamperimeter (Toroidal type)	10 A ≤ I ≤ 15 A 15 A < I < 150 A 150 A ≤ I < 500 A 500 A ≤ I ≤ 1000 A		0.25% 0.27% 0.23% 0.24%	By 5500A Coil I: Measured Current, A
DC Current Meter, Clampmeter Pensamperimeter (Non Toroidal type)	10 A ≤ I ≤ 15 A 15 A < I < 150 A 150 A ≤ I < 500 A 500 A ≤ I ≤ 1000 A		0.56% 1.1% 0.65% 0.48%	with 5500A Coil I: Measured Current, A
DC Current DC Current Source Calibrator: DC Current	20 μA ≤ I ≤ 200 μA 200 μA < I ≤ 2 mA 2 mA < I ≤ 20 mA 20 mA < I ≤ 200 mA 200 mA < I ≤ 2 A 2 A < I ≤ 20 A  20 A ≤ I ≤ 30 A		12 · 10 <sup>-6</sup> · I + 0,34 nA 12 · 10 <sup>-6</sup> · I + 3,4 nA 11 · 10 <sup>-6</sup> · I + 36 nA 34 · 10 <sup>-6</sup> · I + 0,79 μA 0.17 · 10 <sup>-3</sup> · I + 16 μA 0.38 · 10 <sup>-3</sup> · I + 0,4 mA  3.0 mA/A	FLUKE 8508A  I: Measured Current, A  FLUKE 5320A I: Measured Current, A
DC High Current Source	10 A ≤ I ≤ 100 A		1 · 10 <sup>-3</sup> · I + 10 mA	Shunt Resistance Fluke 8508A I: Measured Current, A
AC Voltage AC Voltage Meter AC Voltmeter Multimeter: AC Voltage	2,2 mV ≤ U ≤ 22 mV  22 mV < U ≤ 220 mV	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 20 kHz 20 kHz < f ≤ 100 kHz  10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 20 kHz 20 kHz < f ≤ 50 kHz 50 kHz < f ≤ 100 kHz 100 kHz < f ≤ 300 kHz 300 kHz < f ≤ 500 kHz 500 kHz < f ≤ 1 MHz	0.26 · 10 <sup>-3</sup> U + 4,0 μV 0.11 · 10 <sup>-3</sup> U + 4,0 μV 0.10 · 10 <sup>-3</sup> U + 4,0 μV 0.51 · 10 <sup>-3</sup> U + 5,0 μV  0.29 · 10 <sup>-3</sup> U + 12 μV 0.11 · 10 <sup>-3</sup> U + 6,8 μV 0.10 · 10 <sup>-3</sup> U + 6,9 μV 0.21 · 10 <sup>-3</sup> U + 7,0 μV 0.47 · 10 <sup>-3</sup> U + 17 μV 0.92 · 10 <sup>-3</sup> U + 20 μV 1.5 · 10 <sup>-3</sup> U + 25 μV 2.8 · 10 <sup>-3</sup> U + 45 μV	FLUKE 5720A  U: Measured Voltage, V  FLUKE 5720A U: Measured Voltage, V



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Accreditation Scope

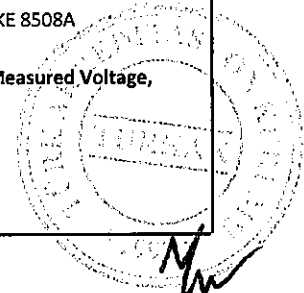


TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI

Accreditation Nr: AB-0092-K

Revision Nr: 09 Date: 03.03.2020

Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
AC Voltage AC Voltage Meter AC Voltmeter Multimeter: AC Voltage Devam)	220 mV < U ≤ 2,2 V	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 20 kHz 20 kHz < f ≤ 50 kHz 50 kHz < f ≤ 100 kHz 100 kHz < f ≤ 300 kHz 300 kHz < f ≤ 500 kHz 500 kHz < f ≤ 1 MHz	0.25 · 10 <sup>-3</sup> U + 40 μV 0.1 · 10 <sup>-3</sup> U + 15 μV 49 · 10 <sup>-6</sup> U + 8 μV 77 · 10 <sup>-6</sup> U + 10 μV 0.12 · 10 <sup>-3</sup> U + 30 μV 0.39 · 10 <sup>-3</sup> U + 80 μV 0.96 · 10 <sup>-3</sup> U + 0,2 mV 1.7 · 10 <sup>-3</sup> U + 0,3 mV	FLUKE 5720A U: Measured Voltage, V
	2,2 V < U ≤ 22 V	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 20 kHz 20 kHz < f ≤ 50 kHz 50 kHz < f ≤ 100 kHz 100 kHz < f ≤ 300 kHz 300 kHz < f ≤ 500 kHz 500 kHz < f ≤ 1 MHz	0.25 · 10 <sup>-3</sup> U + 0,4 mV 0.1 · 10 <sup>-3</sup> U + 0,15 mV 51 · 10 <sup>-6</sup> U + 47 μV 79 · 10 <sup>-6</sup> U + 98 μV 0.11 · 10 <sup>-3</sup> U + 0,2 mV 0.29 · 10 <sup>-3</sup> U + 0,59 mV 1.1 · 10 <sup>-3</sup> U + 2 mV 1.6 · 10 <sup>-3</sup> U + 3,2 mV	FLUKE 5720A U: Measured Voltage, V
	22 V < U ≤ 220 V	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 20 kHz 20 kHz < f ≤ 50 kHz 50 kHz < f ≤ 100 kHz	0.25 · 10 <sup>-3</sup> U + 4 mV 0.1 · 10 <sup>-3</sup> U + 2 mV 57 · 10 <sup>-6</sup> U + 0,58 mV 86 · 10 <sup>-6</sup> U + 1 mV 0.16 · 10 <sup>-3</sup> U + 2,5 mV	FLUKE 5720A U: Measured Voltage, V
	220 V < U ≤ 1000 V	40 Hz ≤ f < 1 kHz 1 kHz < f < 20 kHz 20 kHz < f ≤ 30 kHz	0.11 · 10 <sup>-3</sup> U + 3,5 mV 0.18 · 10 <sup>-3</sup> U + 5,7 mV 0,67 · 10 <sup>-3</sup> U + 11 mV	FLUKE 5720A U: Measured Voltage, V
AC Voltage AC Voltage Source Calibrator: AC Voltage	2 mV ≤ U ≤ 200 mV	10 Hz ≤ f ≤ 40 Hz 40 Hz < f ≤ 100 Hz 100 Hz < f ≤ 2 kHz 2 kHz < f ≤ 10 kHz 10 kHz < f ≤ 30 kHz 30 kHz < f ≤ 100 kHz	0.12 · 10 <sup>-3</sup> U + 4 μV 0.12 · 10 <sup>-3</sup> U + 4 μV 0.12 · 10 <sup>-3</sup> U + 2 μV 0.12 · 10 <sup>-3</sup> U + 4 μV 0.31 · 10 <sup>-3</sup> U + 8 μV 0.70 · 10 <sup>-3</sup> U + 20 μV	FLUKE 8508A U: Measured Voltage, V
	200 mV < U ≤ 2 V	10 Hz ≤ f ≤ 40 Hz 40 Hz < f ≤ 100 Hz 100 Hz < f ≤ 2 kHz 2 kHz < f ≤ 10 kHz 10 kHz < f ≤ 30 kHz 30 kHz < f ≤ 100 kHz 100 kHz < f ≤ 300 kHz 300 kHz < f ≤ 1 MHz	0.11 · 10 <sup>-3</sup> U + 20 μV 86 · 10 <sup>-6</sup> U + 20 μV 67 · 10 <sup>-6</sup> U + 20 μV 86 · 10 <sup>-6</sup> U + 20 μV 0.21 · 10 <sup>-3</sup> U + 40 μV 0.51 · 10 <sup>-3</sup> U + 200 μV 3.0 · 10 <sup>-3</sup> U + 2 mV 10 · 10 <sup>-3</sup> U + 20 mV	FLUKE 8508A U: Measured Voltage, V
	2 V < U ≤ 20 V	10 Hz ≤ f ≤ 40 Hz 40 Hz < f ≤ 100 Hz 100 Hz < f ≤ 2 kHz 2 kHz < f ≤ 10 kHz 10 kHz < f ≤ 30 kHz 30 kHz < f ≤ 100 kHz 100 kHz < f ≤ 300 kHz 300 kHz < f ≤ 1 MHz	0.11 · 10 <sup>-3</sup> U + 0,2 mV 86 · 10 <sup>-6</sup> U + 0,2 mV 67 · 10 <sup>-6</sup> U + 0,2 mV 86 · 10 <sup>-6</sup> U + 0,2 mV 0.2 · 10 <sup>-3</sup> U + 0,4 mV 0.5 · 10 <sup>-3</sup> U + 2 mV 3.0 · 10 <sup>-3</sup> U + 20 mV 10 · 10 <sup>-3</sup> U + 0,2 V	FLUKE 8508A U: Measured Voltage, V



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Accreditation Scope

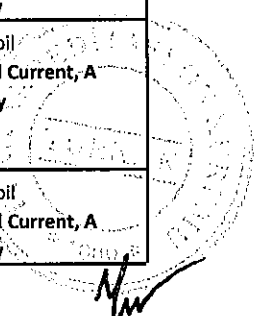


TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI

Accreditation Nr: AB-0092-K

Revision Nr: 09 Date: 03.03.2020

Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
AC Voltage AC Voltage Source Calibrator: AC Voltage Devam)	20 V < U ≤ 200 V	10 Hz ≤ f ≤ 40 Hz 40 Hz < f ≤ 100 Hz 100 Hz < f ≤ 2 kHz 2 kHz < f ≤ 10 kHz 10 kHz < f ≤ 30 kHz 30 kHz < f ≤ 100 kHz	0.11 · 10 <sup>-3</sup> U + 2 mV 92 · 10 <sup>-6</sup> U + 1,9 mV 75 · 10 <sup>-6</sup> U + 1,9 mV 92 · 10 <sup>-6</sup> U + 1,9 mV 0.20 · 10 <sup>-3</sup> U + 4 mV 0.50 · 10 <sup>-3</sup> U + 20 mV	FLUKE 8508A U: Measured Voltage, V
	200 V < U ≤ 1000 V	40 Hz < f ≤ 10 kHz 10 kHz < f ≤ 30 kHz 30 kHz < f ≤ 100 kHz	97 · 10 <sup>-6</sup> U + 19 mV 0.21 · 10 <sup>-3</sup> U + 40 mV 0.51 · 10 <sup>-3</sup> U + 200 mV	FLUKE 8508A U: Measured Voltage, V
AC Current AC Current Meter AC Ampermeter Multimeter: AC Current	100 µA ≤ I ≤ 220 µA	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 1 kHz 1 kHz < f ≤ 5 kHz 5 kHz < f ≤ 10 kHz	0.90 mA/A 0.85 mA/A 0.26 mA/A 0.46 mA/A 1.9 mA/A	FLUKE 5720A I: Measured Current, A
	220 µA < I ≤ 2,2 mA	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 1 kHz 1 kHz < f ≤ 5 kHz 5 kHz < f ≤ 10 kHz	0.36 mA/A 0.29 mA/A 0.30 mA/A 0.72 mA/A 4.1 mA/A	FLUKE 5720A I: Measured Current, A
	2,2 mA < I ≤ 22 mA	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 1 kHz 1 kHz < f ≤ 5 kHz 5 kHz < f ≤ 10 kHz	0.36 mA/A 0.28 mA/A 0.30 mA/A 0.45 mA/A 3.4 mA/A	FLUKE 5720A I: Measured Current, A
	22 mA ≤ I < 220 mA	10 Hz ≤ f ≤ 20 Hz 20 Hz < f ≤ 40 Hz 40 Hz < f ≤ 1 kHz 1 kHz < f ≤ 5 kHz 5 kHz < f ≤ 10 kHz	0.36 mA/A 0.20 mA/A 0.25 mA/A 0.36 mA/A 1.6 mA/A	FLUKE 5720A I: Measured Current, A
	220 mA < I ≤ 2,2 A	20 Hz ≤ f ≤ 1 kHz 1 kHz < f ≤ 5 kHz 5 kHz < f ≤ 10 kHz	0.45 mA/A 0.85 mA/A 7.7 mA/A	FLUKE 5720A I: Measured Current, A
	2,2 A < I ≤ 11 A	40 Hz ≤ f ≤ 1 kHz 1 kHz < f ≤ 5 kHz 5 kHz < f ≤ 10 kHz	1.0 mA/A 2.4 mA/A 4.5 mA/A	FLUKE 5720A I: Measured Current, A f: Frequency
	11 A ≤ I ≤ 20 A	10 Hz ≤ f ≤ 1 kHz 1 kHz ≤ f ≤ 5 kHz	1.5 mA/A 2.4%	FLUKE 5522A I: Measured Current, A f: frequency
	AC Current AC Current Meter, Clampmeter Pensampermeter (Toroidal type)	10 A ≤ I ≤ 15 A	45 Hz ≤ f ≤ 65 Hz 65 Hz < f ≤ 440 Hz	0.28% 0.65%
15 A < I < 150 A		45 Hz ≤ f ≤ 65 Hz 65 Hz < f ≤ 440 Hz	0.35% 0.76%	By 5500A Coil I: Measured Current, A f: frequency



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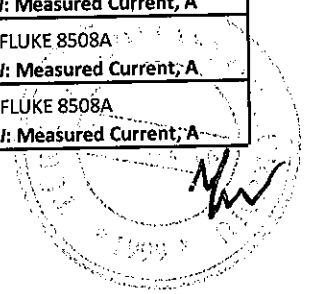


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AB-0092-K

TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI

Accreditation Nr: AB-0092-K  
Revision Nr: 09 Date: 03.03.2020

Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
AC Current AC Current Meter, Clampmeter Pensampermeter (Toroidal type) Devam)	150 A ≤ I < 500 A	45 Hz ≤ f ≤ 65 Hz 65 Hz < f ≤ 440 Hz	0.28% 0.67%	By 5500A Coil I: Measured Current, A f: frequency
	500 A ≤ I ≤ 1000 A	45 Hz ≤ f ≤ 65 Hz 65 Hz < f ≤ 440 Hz	0.27% 0.64%	By 5500A Coil I: Measured Current, A f: Frequency
AC Current AC Current Meter, Clampmeter Pensampermeter (Non Toroidal type)	10 A ≤ I ≤ 15 A	45 Hz ≤ f ≤ 65 Hz 65 Hz < f ≤ 440 Hz	0.68% 1.0%	By 5500A Coil I: Measured Current, A f: Frequency
	15 A < I < 150 A	45 Hz ≤ f ≤ 65 Hz 65 Hz < f ≤ 440 Hz	1.8% 2.1%	By 5500A Coil I: Measured Current, A f: frequency
	150 A ≤ I < 500 A	45 Hz ≤ f < 65 Hz 65 Hz ≤ f < 440 Hz	0.90% 1.3%	By 5500A Coil I: Measured Current, A f: Frequency
	500 A ≤ I ≤ 1000 A	45 Hz ≤ f ≤ 65 Hz 65 Hz < f ≤ 440 Hz	0.59% 0.92%	By 5500A Coil I: Measured Current, A f: Frequency
AC Current AC Current Source  Calibrator: AC Current	100 µA ≤ I ≤ 200 µA	10 Hz ≤ f ≤ 10 kHz 10 kHz < f ≤ 30 kHz	0.29 · 10 <sup>-3</sup> I + 19 nA 0.72 · 10 <sup>-3</sup> I + 18 nA	FLUKE 8508A I: Measured Current, A
	200 µA < I ≤ 2 mA	10 Hz ≤ f ≤ 10 kHz 10 kHz < f ≤ 30 kHz	0.26 · 10 <sup>-3</sup> I + 0,2 µA 0.61 · 10 <sup>-3</sup> I + 0,2 µA	FLUKE 8508A I: Measured Current, A
	2 mA < I ≤ 20 mA	10 Hz ≤ f ≤ 10 kHz 10 kHz < f ≤ 30 kHz	0.26 · 10 <sup>-3</sup> I + 2 µA 0.61 · 10 <sup>-3</sup> I + 2 µA	FLUKE 8508A I: Measured Current, A
	20 mA < I ≤ 200 mA	10 Hz ≤ f ≤ 10 kHz 10 kHz < f ≤ 30 kHz	0.26 · 10 <sup>-3</sup> I + 20 µA 0.61 · 10 <sup>-3</sup> I + 20 µA	FLUKE 8508A I: Measured Current, A
	200 mA < I ≤ 2 A	10 Hz ≤ f ≤ 2 kHz 2 kHz < f ≤ 10 kHz	0.60 · 10 <sup>-3</sup> I + 0,2 mA 0.73 · 10 <sup>-3</sup> I + 0,2 mA	FLUKE 8508A I: Measured Current, A
	2 A < I ≤ 20 A	10 Hz ≤ f ≤ 2 kHz 2 kHz < f ≤ 10 kHz	0.81 · 10 <sup>-3</sup> I + 2 mA 2.5 · 10 <sup>-3</sup> I + 2 mA	FLUKE 8508A I: Measured Current, A



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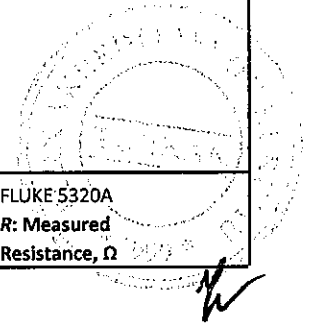


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Accreditation Nr: AB-0092-K


Revision Nr: 09 Date: 03.03.2020

Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
DC Resistance DC Resistance Meter Multimeter: Resistance, Ohmmeter	1 mΩ 10 mΩ 100 mΩ 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 1 GΩ	4 Wires	0.42 mΩ/Ω 0.11 mΩ/Ω 42 μΩ/Ω 27 μΩ/Ω 48 μΩ/Ω 19 μΩ/Ω 15 μΩ/Ω 37 μΩ/Ω 12 μΩ/Ω 67 μΩ/Ω 34 μΩ/Ω 1.1 mΩ/Ω	By Standard Resistor
DC Resistance DC Resistance Meter Multimeter: Resistance, Ohmmeter	1 Ω 1,9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 kΩ 1,9 kΩ 10 kΩ 19 kΩ 100 kΩ 190 kΩ 1 MΩ 1,9 MΩ 10 MΩ 19 MΩ 100 MΩ	4 Wires (2 Wires for 100 MΩ)	96 μΩ/Ω 98 μΩ/Ω 25 μΩ/Ω 26 μΩ/Ω 12 μΩ/Ω 13 μΩ/Ω 10 μΩ/Ω 12 μΩ/Ω 10 μΩ/Ω 12 μΩ/Ω 13 μΩ/Ω 14 μΩ/Ω 21 μΩ/Ω 27 μΩ/Ω 41 μΩ/Ω 55 μΩ/Ω 0.11 mΩ/Ω	FLUKE 5720A
	0 Ω ≤ R < 11 Ω 11 Ω ≤ R < 33 Ω 33 Ω ≤ R ≤ 110 Ω 110 Ω < R ≤ 330 Ω 330 Ω < R ≤ 1,1 kΩ 1,1 kΩ < R ≤ 3,3 kΩ 3,3 kΩ < R ≤ 11 kΩ 11 kΩ < R ≤ 33 kΩ 33 kΩ < R ≤ 110 kΩ 110 kΩ < R ≤ 330 kΩ 330 kΩ < R ≤ 1,1 MΩ 1,1 MΩ < R ≤ 3,3 MΩ 3,3 MΩ < R ≤ 11 MΩ 11 MΩ < R ≤ 33 MΩ 33 MΩ < R ≤ 110 MΩ 110 MΩ < R ≤ 330 MΩ 330 MΩ ≤ R ≤ 1100 MΩ		31 · 10 <sup>-6</sup> R + 7,8 mΩ 23 · 10 <sup>-6</sup> R + 12 mΩ 22 · 10 <sup>-6</sup> R + 12 mΩ 22 · 10 <sup>-6</sup> R + 16 mΩ 21 · 10 <sup>-6</sup> R + 18 mΩ 21 · 10 <sup>-6</sup> R + 24 mΩ 21 · 10 <sup>-6</sup> R + 0,11 Ω 22 · 10 <sup>-6</sup> R + 0,81 Ω 21 · 10 <sup>-6</sup> R + 1,1 Ω 24 · 10 <sup>-6</sup> R + 8,9 Ω 12 · 10 <sup>-6</sup> R + 49 Ω 29 · 10 <sup>-6</sup> R + 0,3 kΩ 67 · 10 <sup>-6</sup> R + 0,92 kΩ 74 · 10 <sup>-6</sup> R + 15 kΩ 0.14 · 10 <sup>-3</sup> R + 77 kΩ 2.3 · 10 <sup>-3</sup> R + 43 kΩ 12 · 10 <sup>-3</sup> R + 0,45 MΩ	FLUKE 5522A R: Measured Resistance, Ω
	1 GΩ < R ≤ 2 GΩ		11 mΩ/Ω	FLUKE 5320A R: Measured Resistance, Ω

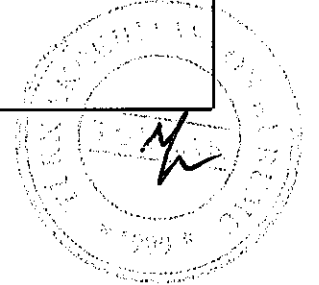


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Accreditation Scope

 Kalibrasyon TS EN ISO IEC 17025 AB-0092-K	<b>TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI</b>  Accreditation Nr: AB-0092-K Revision Nr: 09 Date: 03.03.2020
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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Resistance (R) Meter Insulation Tester	1 GΩ ≤ R ≤ 10 GΩ 10 GΩ < R ≤ 100 GΩ 100 GΩ < R ≤ 1 TΩ		50 mΩ/Ω 51 mΩ/Ω 58 mΩ/Ω	Decade R : Measured Resistance , Ω
Resistance DC Resistance Source, DC Resistance Standart, Decade Resistance Calibrator: Resistance	1 mΩ ≤ R ≤ 2 Ω 2 Ω < R ≤ 20 Ω 20 Ω < R ≤ 200 Ω 200 Ω < R ≤ 2 kΩ 2 kΩ < R ≤ 20 kΩ 20 kΩ < R ≤ 200 kΩ	4 wire	11 · 10 <sup>-6</sup> R + 4 μΩ 7.7 · 10 <sup>-6</sup> R + 26 μΩ 10 μΩ/Ω 10 μΩ/Ω 10 μΩ/Ω 11 μΩ/Ω	FLUKE 8508A R: Measured Resistance, Ω
	200 kΩ < R ≤ 2 MΩ 2 MΩ < R ≤ 20 MΩ 20 MΩ < R ≤ 200 MΩ 200 MΩ < R ≤ 2 GΩ	4 wire or 2 wire	14 μΩ/Ω 16 · 10 <sup>-6</sup> R + 91 Ω 51 · 10 <sup>-6</sup> R + 9,7 kΩ 0.52 · 10 <sup>-3</sup> R + 1 MΩ	FLUKE 8508A R: Measured Resistance, Ω
AC High Voltage (ACHV) Source	1 kV ≤ U ≤ 10 kV	60 Hz	0.27 %	High Voltage Divider and Multimeter U : Measured Voltage
DC High Voltage (DCHV) Source	1 kV ≤ U ≤ 15 kV		0.15%	High Voltage Divider and Multimeter U : Measured Voltage
DC Power Powermeter	0,011 W ≤ P ≤ 33 W 0,11 W ≤ P ≤ 330 W 1,1 W ≤ P ≤ 3000 W 9,9 W ≤ P ≤ 10 kW 33 W ≤ P ≤ 20 kW	3,3 V ≤ U ≤ 1000 V 3,3 mA ≤ I ≤ 33 mA 3,3 V ≤ U ≤ 1000 V 3,3 mA ≤ I ≤ 330 mA 3,3 V ≤ U ≤ 1000 V 330 mA ≤ I ≤ 3 A 3,3 V ≤ U ≤ 1000 V 3 A ≤ I ≤ 10 A 3,3 V ≤ U ≤ 1000 V 10 A ≤ I ≤ 20 A	2.2 · 10 <sup>-4</sup> · P + 3,7 μW 2.2 · 10 <sup>-4</sup> · P + 37 μW 1.3 · 10 <sup>-3</sup> · P + 8,6 mW 1.1 · 10 <sup>-3</sup> · P + 0,2 mW 2.1 · 10 <sup>-3</sup> · P + 3,6 μW	P: Power U: Voltage I: Current



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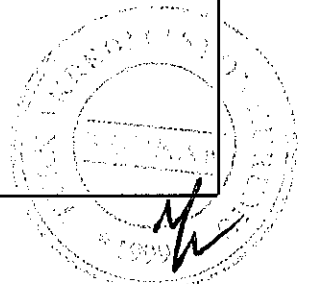


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Accreditation Nr: AB-0092-K

Revision Nr: 09 Date: 03.03.2020

Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
AC POWER Powermeter	0,011 W ≤ P ≤ 33 W	Voltage: 3,3 V - 1000 V Current: 0,003A - 0,033A Power Factor: 1 i/c Frequency: 0 Hz - 55 Hz	6.3·10 <sup>-4</sup> · P + 0,3 mW	P: Power U: Voltage I: Current
		Voltage: 3,3 V - 1000 V Current: 0,003A - 0,033A Power Factor: 1 i/c Frequency: 55 Hz - 1 kHz	2.9·10 <sup>-3</sup> · P + 0,2 mW	
	0,11 W ≤ P ≤ 330 W	Voltage: 3,3 V - 1000 V Current: 0,033 A - 0,330 A Power Factor: 1 i/c Frequency: 0 Hz - 55 Hz	6.3·10 <sup>-4</sup> · P + 2,2 mW	P: Power U: Voltage I: Current
		Voltage: 3,3 V - 1000 V Current: 0,033 A - 0,330 A Power Factor: 1 i/c Frequency: 55 Hz - 1 kHz	3·10 <sup>-3</sup> · P + 1,1 mW	
	1,1 W ≤ P ≤ 3000 W	Voltage: 3,3 V - 1000 V Current: 0,330 A - 3 A Power Factor: 1 i/c Frequency: 0 Hz - 55 Hz	5.3·10 <sup>-4</sup> · P + 22,1 mW	P: Power U: Voltage I: Current
		Voltage: 3,3 V - 1000 V Current: 0,330 A - 3 A Power Factor: 1 i/c Frequency: 55 Hz - 1 kHz	3.5·10 <sup>-3</sup> · P + 9,2 mW	
	9,9 W ≤ P ≤ 10 kW	Voltage: 3,3 V - 1000 V Current: 3 A - 10 A Power Factor: 1 i/c Frequency: 0 Hz - 55 Hz	6.9·10 <sup>-4</sup> · P + 0,3 W	P: Power U: Voltage I: Current
		Voltage: 3,3 V - 1000 V Current: 3 A - 10 A Power Factor: 1 i/c Frequency: 55 Hz - 1 kHz	2.9·10 <sup>-3</sup> · P + 0,2 W	





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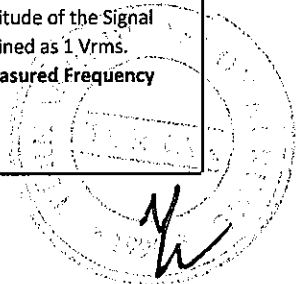


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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
AC POWER Powermeter Devam)	33 W ≤ P ≤ 20 kW	Voltage: 3,3 V - 1000 V Current: 10 A - 20 A Power Factor: 1 i/c Frequency: 0 Hz - 55 Hz  Voltage: 3,3 V - 1000 V Current: 10 A - 20 A Power Factor: 1 i/c Frequency: 55 Hz - 1 kHz	7.5·10 <sup>-4</sup> · P + 0,5 W  2.9·10 <sup>-3</sup> · P + 0,3 W	P: Power U: Voltage I: Current
Signal and Pulse Characteristics Vertical Deviation (Gain) Oscilloscope	1 mV ≤ U ≤ 5V	DC 50 Ω - 1 MΩ	3.5 · 10 <sup>-3</sup> · U + 22 μV	FLUKE 9500B  U : Measured voltage
Signal and Pulse Characteristics Horizontal Deviation Oscilloscope	4 ns ≤ T < 40 ns 40 ns ≤ T < 400 ns 400 ns ≤ T < 4 μs 4 μs ≤ T < 40 μs 40 μs ≤ T < 400 μs 400 μs ≤ T < 4 ms 4 ms ≤ T < 40 ms 40 ms ≤ T < 400 ms 400 ms ≤ T < 1 s	1 Vp-p	2.0 ms/s 2.9 ms/s 1.4 ms/s 1.4 ms/s 4.4 ms/s 2.3 ms/s 4.2 ms/s 1.1 ms/s 1.8 ms/s	FLUKE 9500B  T : Measured Time
Signal and Pulse Characteristics Bandwidth Oscilloscope	BW ≤ 3,2 GHz		2.7.BW%	FLUKE 9500B  BW : Bandwidth
TIME AND FREQUENCY  Frequency Meters  Frequency Counter Calibration	1 Hz ≤ f < 10 Hz 10 Hz ≤ f ≤ 100 Hz	Gate Time:  10 s	2.8·10 <sup>-4</sup> ·f 1.3·10 <sup>-5</sup> ·f	GPS Disciplined Oscillator Amplitude of the Signal sustained as 1 Vrms. f: Measured Frequency
	100 Hz ≤ f < 1 kHz 1 kHz ≤ f < 10 kHz 10 kHz ≤ f < 100 kHz 100 kHz ≤ f < 1 MHz 1 MHz ≤ f < 10 MHz 10 MHz ≤ f < 100 MHz 100 MHz ≤ f < 1 GHz 1 GHz ≤ f ≤ 20 GHz	1 s	2.5·10 <sup>-6</sup> ·f 1.3·10 <sup>-6</sup> ·f 1.3·10 <sup>-7</sup> ·f 1.3·10 <sup>-8</sup> ·f 1.3·10 <sup>-9</sup> ·f 1.3·10 <sup>-10</sup> ·f 4.3·10 <sup>-11</sup> ·f 4.1·10 <sup>-11</sup> ·f	GPS Disciplined Oscillator Amplitude of the Signal sustained as 1 Vrms. f: Measured Frequency

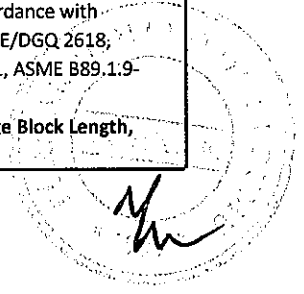


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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
<b>TIME AND FREQUENCY</b>  Frequency Sources  Frequency Generator Calibration	$1 \text{ Hz} \leq f < 10 \text{ Hz}$ $10 \text{ Hz} \leq f \leq 100 \text{ Hz}$	Gate Time:  10 s	$2.8 \cdot 10^{-4} \cdot f$ $1.3 \cdot 10^{-5} \cdot f$	GPS Disciplined Oscillator Amplitude of the Signal sustained as 1 Vrms <b>f: Measured Frequency</b>
	$100 \text{ Hz} \leq f < 1 \text{ kHz}$ $1 \text{ kHz} \leq f < 10 \text{ kHz}$ $10 \text{ kHz} \leq f < 100 \text{ kHz}$ $100 \text{ kHz} \leq f < 1 \text{ MHz}$ $1 \text{ MHz} \leq f < 10 \text{ MHz}$ $10 \text{ MHz} \leq f < 100 \text{ MHz}$ $100 \text{ MHz} \leq f < 1 \text{ GHz}$ $1 \text{ GHz} \leq f \leq 20 \text{ GHz}$	1 s	$2.5 \cdot 10^{-6} \cdot f$ $1.3 \cdot 10^{-6} \cdot f$ $1.3 \cdot 10^{-7} \cdot f$ $1.3 \cdot 10^{-8} \cdot f$ $1.3 \cdot 10^{-9} \cdot f$ $1.3 \cdot 10^{-10} \cdot f$ $4.3 \cdot 10^{-11} \cdot f$ $4.1 \cdot 10^{-11} \cdot f$	GPS Disciplined Oscillator Amplitude of the Signal sustained as 1 Vrms <b>f: Measured Frequency</b>
<b>TIME AND FREQUENCY</b>  Time Interval  stopwatch	$1 \text{ s} \leq t \leq 3600 \text{ s}$	with reference counter	0.0016 s	t: time interval (s) or measured daily deviation (s/day)
	$1 \text{ s} \leq t \leq 3600 \text{ s}$	field calibration with reference stopwatch	0.023 s	s: second
	$-20 \text{ s/day} \leq t \leq +20 \text{ s/day}$	with reference calibrator	0.013 s/day	calibration at laboratory or field
<b>DIMENSIONAL</b>  Gauge Blocks	$0,5 \text{ mm} \leq L \leq 100 \text{ mm}$	Vertical Orientation	$(0.12 + 9 \cdot L) \mu\text{m}$	Mechanical Comparison Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 3.1, ASME B89.1.9-2002 <b>L: Gauge Block Length, m</b>
Long Gauge Blocks	$100 \text{ mm} < L \leq 500 \text{ mm}$	Horizontal Orientation	$(0.23 + 9 \cdot L) \mu\text{m}$	Mechanical Comparison Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 3.1, ASME B89.1.9-2002 <b>L: Gauge Block Length, m</b>

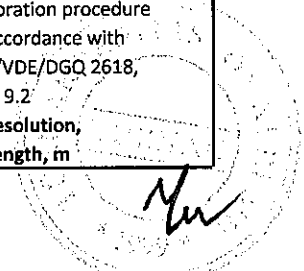


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Accreditation Scope


 Kalibrasyon TS EN ISO IEC 17025 AB-0092-K	<b>TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI</b>  Accreditation Nr: AB-0092-K Revision Nr: 09 Date: 03.03.2020
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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Dial Gauges	$L \leq 100$ mm	$r: 0,001$ mm	$(1.5 + 20 \cdot L)$ $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 11.1 $r$ : Resolution, $L$ : Length, m
Dial Indicator	$L \leq 3$ mm	$r: 0,001$ mm	1 $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 11.2 $r$ : Resolution, $L$ : Length, m
Lever Gauges	$L \leq 2$ mm	$r: 0,001$ mm	1 $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 11.3 $r$ : Resolution, $L$ : Length, m
Dial Thickness Gauges	$L \leq 50$ mm	$r: 0,001$ mm	$(1 + 10 \cdot L)$ $\mu$ m	Comparison to gage blocks $r$ : Resolution, $L$ : Length, m
Int. and Ext. Dial Caliper Gauges	External Measurement $L \leq 200$ mm, Internal Measurement $L \leq 100$ mm	$r: 0,005$ mm $r: 0,05$ mm	$(4 + 10 \cdot L)$ $\mu$ m $(6 + 10 \cdot L)$ $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 12.1, VDI/VDE/DGQ 2618, Part 13.1, $r$ : Resolution, $L$ : Length, m
Calipers	$0 < L \leq 500$ mm $500 < L \leq 2000$ mm	Internal , External Measurement, Depth and Step Measurement $r: 0,01$ mm	$(7 + 13 \cdot L)$ $\mu$ m $(2 + 23 \cdot L)$ $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 9.1 $r$ : Resolution, $L$ : Length, m
Depth Calipers	$0 < L \leq 500$ mm $500 < L \leq 1000$ mm	$r: 0,01$ mm	$(13 + 5 \cdot L)$ $\mu$ m $(11 + 9 \cdot L)$ $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 9.2 $r$ : Resolution, $L$ : Length, m

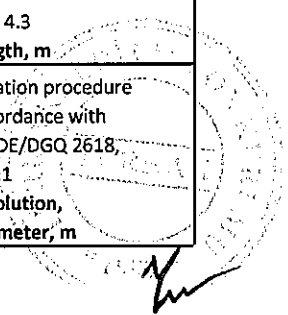


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**Accreditation Scope**

 Kalibrasyon TS EN ISO IEC 17025 AB-0092-K	<p><b>TÜRK HAVA YOLLARI TEKNİK A.Ş. KALİBRASYON LABORATUVARI</b></p> <p>Accreditation Nr: AB-0092-K Revision Nr: 09 Date: 03.03.2020</p>
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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Height Calipers	$L \leq 1000$ mm	$r: 0,001$ mm	$(3.1 + 20 \cdot L) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 9.3 $r$ : Resolution, $L$ : Length, m
Micrometers	$L \leq 500$ mm $500 \text{ mm} \leq L \leq 1500$ mm	$r: 0,001$ mm $r: 0,01$ mm	$(1.5 + 12 \cdot L) \mu\text{m}$ $(3.5 + 12 \cdot L) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 10.1 $r$ : Resolution, $L$ : Length, m
Micrometers with Dial Indicator	$L \leq 500$ mm $500 \text{ mm} \leq L \leq 1500$ mm	$r: 0,001$ mm $r: 0,002$ mm	$1 \mu\text{m}$ $1.5 \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 10.3 $r$ : Resolution, $L$ : Length, m
Depth Micrometers	$L \leq 300$ mm	$r: 0,001$ mm	$(1.5 + 8 \cdot L) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 10.5 $r$ : Resolution, $L$ : Length, m
Internal Micrometer (2- point contact Micrometers)	$25 \text{ mm} \leq L \leq 590$ mm	$r: 0,001$ mm	$(1.2 + 3 \cdot L) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 10.7 $r$ : Resolution, $L$ : Length, m
Internal Micrometer (3-point contact Micrometers)	$2,5 \text{ mm} \leq L \leq 205$ mm	$r: 0,001$ mm	$(2.3 + 2,1 \cdot L) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 10.8 $r$ : Resolution, $L$ : Length, m
Reference Gauges for Micrometers	$L \leq 590$ mm		$(0.8 + 3,3 \cdot L) \mu\text{m}$	Calibration procedure in accordance with DKD-R 4.3 $L$ : Length, m
Outside Cylinder (Plug Gauge)	$D \leq 100$ mm		$(1.1 + 15 \cdot D) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 4.1 $r$ : Resolution, $D$ : diameter, m



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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Inside Cylinder (Ring Gauges)	$1 \text{ mm} \leq D \leq 305 \text{ mm}$		$(1.1 + 20 \cdot D) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 4.1 <b>D: Diameter, m</b>
Snap Gauges	$5 \text{ mm} \leq L \leq 150 \text{ mm}$		$(1 + 5 \cdot L) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 4.7 <b>L: Dimension, m</b>
Cylindrical Measuring Pins	$0,1 \text{ mm} \leq D \leq 20 \text{ mm}$	Steel	$(0.8 + 2 \cdot D) \mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 4.2 <b>D: Diameter, m</b>
Screw Plug Gauges	External Thread $1 \text{ mm} \leq D \leq 100 \text{ mm}$	Pitch 0,35- 6 mm	2.5 $\mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 4.8, ISO 228, BS 919, ISO 1502, ANSI/ASME B1.1,B1.2 Go - No Go Check <b>D: Diameter, m</b>
Screw Ring Gauges	Internal Thread $5 \text{ mm} \leq D \leq 100 \text{ mm}$	Pitch 0,35- 6 mm	3.3 $\mu\text{m}$	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 4.9, ISO 228, BS 919, ISO 1502, ANSI/ASME B1.1,B1.2 Go-No Go Check <b>D: Diameter</b>
Protractors	$\alpha \leq 360^\circ$	Gauge bar below 300 mm	1'	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 7.2 <b><math>\alpha</math>: Angle</b>
Screwthreaded Gauge	$L \leq 7 \text{ mm}$	Pitch Angle (Angle Scale) Angle (Measured Points)	14.1 $\mu\text{m}$ 5.4' 14'	Optical Measuring Method <b>L: Pitch Length, m</b>
Radius Gauges	$1 \text{ mm} \leq r \leq 25 \text{ mm}$		14.5 $\mu\text{m}$	Optical Measuring Method <b>r: radius</b>
Feeler Gauges	$0,03 \text{ mm} \leq L \leq 2 \text{ mm}$		0.5 $\mu\text{m}$	Calibration procedure in accordance with DIN 2275 <b>L: Thickness</b>

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## Accreditation Scope



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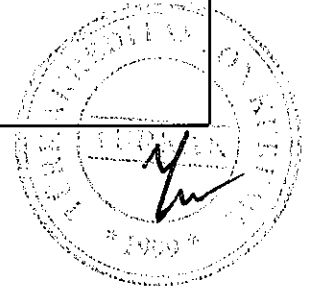
Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Steel Rules	$L \leq 500$ mm $L \leq 3000$ mm		$(14 + 5 \cdot L)$ $\mu$ m $(93 + 18 \cdot L)$ $\mu$ m	Optical Measuring Method Comparison to Reference Scale Calibration procedure in accordance with DIN 865, DIN 866 <b>L: Length, m</b>
Tape Measure	$L \leq 50$ m		$(82 + 18 \cdot L)$ $\mu$ m	Calibration procedure in accordance with TS 9505 <b>L: Length, m</b>
Test Sieves	$20 \mu\text{m} \leq L \leq 125$ mm	Mesh Distance	13 $\mu$ m	Calibration procedure in accordance with ISO 3310 <b>L: Mesh Measurement, m</b>
Thickness Foils	$7 \mu\text{m} \leq L \leq 8000$ $\mu$ m		0.7 $\mu$ m	Calibration procedure in accordance with DIN EN ISO 2178 <b>L: Thickness, m</b>
Ultrasonic Thickness Gauges	$L \leq 100$ mm	r: 0,001 mm	5 $\mu$ m	Measurement Method with Block Gauge <b>r: Resolution</b>
Profile Projection and Microscopes	$L \leq 200$ mm	r: 0,001 mm	$(7.2 + 7 \cdot L)$ $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2617 Length Scale Check <b>r: Resolution, L: Length, m</b>
Coating Thickness Gauges	$L \leq 2$ mm	r: 0,001 mm	2.5 $\mu$ m	Calibration procedure in accordance with DIN EN ISO 2178 <b>r: Resolution, L: Thickness, m</b>
Steel Squares	$L < 200$ mm $L \leq 500$ mm	Diklik/Düzlemsellik Diklik Düzlemsellik	$(13 + 5 \cdot L)$ $\mu$ m $(23 + 4 \cdot L)$ $\mu$ m $(12 + 10 \cdot L)$ $\mu$ m	Calibration procedure in accordance with VDI/VDE/DGQ 2618, Part 7.1 <b>L: Length, m</b>

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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
WEIGHT  Class F <sub>1</sub>	1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg		0.03 mg 0.04 mg 0.05 mg 0.06 mg 0.08 mg 0.1 mg 0.16 mg 0.3 mg 0.8 mg 1.6 mg 3.0 mg 8.0 mg 16 mg	Calibration procedure in accordance with OIML R111 Determination of Conventional weight
Class F <sub>2</sub>	1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg		0.10 mg 0.12 mg 0.16 mg 0.20 mg 0.25 mg 0.3 mg 0.5 mg 1.0 mg 2.5 mg 5.0 mg 10 mg 25 mg 50 mg	Calibration procedure in accordance with OIML R111 Determination of Conventional weight
Class M <sub>1</sub>	1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 50 kg		0.3 mg 0.4 mg 0.5 mg 0.6 mg 0.8 mg 1.0 mg 1.6 mg 3.0 mg 8.0 mg 16 mg 30 mg 80 mg 160 mg 300 mg 800 mg	Calibration procedure in accordance with OIML R111 Determination of Conventional weight

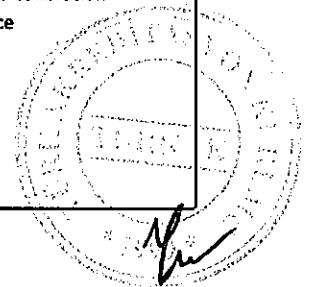


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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Non Standart Weights	1 g $1 g < m \leq 2 g$ $2 g < m \leq 5 g$ $5 g < m \leq 10 g$ $10 g < m \leq 20 g$ $20 g < m \leq 50 g$ $50 g < m \leq 100 g$ $100 g < m \leq 200 g$ $200 g < m \leq 500 g$ $500 g < m \leq 1 kg$ $1 kg < m \leq 2 kg$ $2 kg < m \leq 5 kg$ $5 kg < m \leq 10 kg$ $10 kg < m \leq 20 kg$ $20 kg < m \leq 50 kg$		10 mg 12 mg 16 mg 20 mg 25 mg 30 mg 50 mg 100 mg 250 mg 500 mg 1000 mg 2500 mg 5000 mg 10000 mg 25000 mg	<i>m</i> : nominal mass Calibration procedure in accordance with OIML R111 Determination of Conventional weight
<b>BALANCE</b> Non-Automatic Weighing Instruments	$1 mg < m \leq 10000 g$ $1 g < m \leq 50 kg$ $10 kg < m \leq 1000 kg$	With Class E <sub>2</sub> With Class F <sub>1</sub> With Class M <sub>1</sub>	$2.2 \times 10^{-6}$ $6.9 \times 10^{-6}$ $6.9 \times 10^{-5}$	Calibration procedure in accordance with EURAMET Cg/18-v04 Calibrations are performed on balance site <i>m</i> : mass
<b>FORCE</b> Force Transducer, Loadcell, Proving Ring, Dynamometer	$0,45 kN \leq F \leq 4,5 kN$ $2 kN \leq F \leq 40 kN$ $40 kN \leq F \leq 100 kN$ $40 kN \leq F \leq 200 kN$	Tension and Compression with 00 Class Loadcell  Tension and Compression with 00 Class Loadcell  Tension and Compression with 00 Class Loadcell  Tension and Compression with 00 Class Loadcell	0.12% 0.12% 0.05% 0,3%	Calibration procedure in accordance with DAkS-DKD-R 3-3 , EN ISO 376, ASTM E74. Hydraulic force calibration machine with referance force transducer is used. <b>F: Force</b>
Material Testing Machines, Tension Testing Machines, Compression Testing Machines, Tension/Compression Testing Machines	$0,45 kN \leq F \leq 4,5 kN$ $2 kN \leq F \leq 20 kN$ $20 kN \leq F \leq 200 kN$	Tension and compression with 0,5 Class Loadcell  Tension and compression with 0,5 Class Loadcell  Tension and compression with 0,5 Class Loadcell	0.16 % 0.16 % 0.16 %	Calibration procedure in accordance with TS EN ISO 7500-1 On Site Calibration <b>F: Force</b>





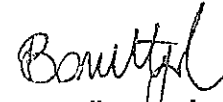
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## Accreditation Scope

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Measured Quantity/Calibrated Items	Range	Measurement Conditions	Calibration and Measurement Capability (k=2)	Remarks/ Calibration Method
Hand Type Force Gauge, Tension/Compression	$0,5 \text{ N} \leq F \leq 500 \text{ N}$	Tension and Compression with Dead Weight	0.12 %	Calibration procedure in accordance with DAKKS-DKD-R 3-3 F: Force
OPTICS Illuminance Responsivity Luxmeter	$3 \text{ lx} \leq E_v \leq 5000 \text{ lx}$	2856 K	1.0 %	E <sub>v</sub> : Illuminance Level Calibration procedure in accordance with ISO/CIE 19476
Responsivity, UV, Broadband irradiance UVA Radiometer	$0,015 \text{ W/m}^2 \leq E_e \leq 70 \text{ W/m}^2$	UV-A range	5.3 %	E <sub>e</sub> : Irradiance Responsivity Comparison Method
Luminance Responsivity Luminance meter	$120 \text{ cd/m}^2 \leq L_v \leq 1214 \text{ cd/m}^2$	2856 K	2.7 %	L <sub>v</sub> : Luminance Responsivity Calibration procedure in accordance with ISO/CIE 19476

End of Scope



**G. Banu MÜDERRİSOĞLU**  
Secretary General

