CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Collaborative Testing Services, Inc.

21331 Gentry Drive
Sterling, VA 20166

Fulfills the requirements of

ISO/IEC 17043:2023

In the field of

PROFICIENCY TESTING PROVIDER

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 31 July 2026

Certificate Number: AP-1884

This proficiency testing provider is accredited in accordance with the recognized International Standard ISO/IEC 17043:2023. This accreditation demonstrates technical competence for a defined scope and the operation of a proficiency testing provider quality management system.

SCOPE OF ACCREDITATION TO ISO/IEC 17043:2023

Collaborative Testing Services, Inc.

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PROFICIENCY TEST PROVIDER

ISO/IEC 17043 Accreditation Granted: 17 July, 2024

Certificate Number: AP-1884 Certificate Expiry Date: 31 July 2026

Agriculture: Chemical

Description of Item	Properties Measured	Procedure for Establishing Assigned Value
Soil	Salinity pH and EC Buffer pH, Lime Req. Inorganic Nitrogen Phosphorus and Sulfur Bases (K, Ca, Mg, N, Al) Mehlich-1 Multi Element Mehlich-3 Multi Element Micronutrients Soil Organic Matter CEC	Consensus Value from Participants
Botanicals	Wet Digestion – Nutrients Dry Ash – Nutrients Heavy Metals	Consensus Value from Participants
Water	pH and EC Cations Anions Other Nutrients	Consensus Value from Participants

Agriculture: Physical Chemical

Description of Item	Properties Measured	Procedure for Establishing Assigned Value
Soil	Densities Particle Size Analysis Moisture Related Properties	Consensus Value from Participants
Botanicals	Dry Matter Dry Ash	Consensus Value from Participants

Containerboard: Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Linerboard	Burst Strength Ring Crush Strength (RCT) Short Span Compression Strength (STFI) Internal Bonding Strength Coefficient of Friction (Slide Angle) Air Resistance (Gurley Type)	TAPPI T807 TAPPI T822 TAPPI T826 TAPPI T569 TAPPI T815 TAPPI T460	Consensus Value from Participants
Medium	Flat Crush Strength (CMT) Fluted Edge Crush Ring Crush Strength Short Span Compression Strength (STFI)	TAPPI T809 TAPPI T824 TAPPI T822 TAPPI T826	Consensus Value from Participants
Corrugated Boxes	Top-to-Bottom Compression (BCT)	TAPPI T804	Consensus Value from Participants
Corrugated Fiberboard	Edge Crush Compression (ECT)	TAPPI T811 TAPPI T839	Consensus Value from Participants

Containerboard: Physical Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Linerboard	Roughness (Stylus Method) Roughness (Sheffield Method)	TAPPI T575 TAPPI T538	Consensus Value from Participants

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Color and Appearance: Optical

Description of Item	Properties Measured	Range of Property	Procedure for Establishing Assigned Value
Color Paint Chip	Directional Color and Color Difference 45-0(0-45) Diffuse Color and Color Difference (Sphere Geometry) Diffuse Spectral Reflectance	N/A	Consensus Value from Participants
Color Paint Chip	Specular Gloss, 60 Degrees	(30 to 75) gloss units	Consensus Value from Participants

Fasteners and Metals: Chemical

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Aluminum Alloy	Chemical Analysis Percent composition of indicated elements	ASTM E34 ASTM E1251 ISO 3980	Consensus Value from Participants
Carbon and Low Alloy Steel	Chemical Analysis Percent composition of indicated elements	ASTM E322 ASTM E415 ASTM E1019 ASTM E1085	Consensus Value from Participants
Copper-Based Alloy	Chemical Analysis Percent composition of indicated elements	ASTM E478 ISO 4751	Consensus Value from Participants
Corrosion Resistant Steel	Chemical Analysis Percent composition of indicated elements	ASTM E1019 ASTM E1086 ASTM E572	Consensus Value from Participants
Nickel-Based Alloy	Chemical Analysis Percent composition of indicated elements	ASTM E1019 ASTM E2465 ASTM E2594 ISO 7530	Consensus Value from Participants
Titanium-Based Alloy	Chemical Analysis Percent composition of indicated elements	ASTM E539 ASTM E1409 ASTM E1447	Consensus Value from Participants

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Fasteners and Metals: Dimensional Metrology

Description of Item	Properties Measured	Procedure for Establishing Assigned Value
Plain Plug Gage	Dimensional Outside Diameter (OD)	Reference Value

Fasteners and Metals: Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Flat Steel Tensile Blanks Pre-machined Steel Tensile Specimens Round Steel Tensile Blanks Flat Aluminum Tensile Blanks	Tensile	ASTM E8 ASTM E517 ASTM E646 ASTM B557	Consensus Value from Participants
Fasteners	Wedge Tensile Axial Tensile Rockwell (C) Scale Vickers Hardness Double Shear	ASTM F606 SAE J429 ASTM F606 ASTM F606M ASTM E18 ASTM E92 NASM 1312-13	Consensus Value from Participants
Steel Test Blocks	Rockwell B Scale Hardness Rockwell C Scale Hardness Microhardness (Knoop and Vickers) Brinell Hardness Rockwell Superficial Hardness (30N Scale) Vickers Hardness	ASTM E18 ASTM E384 ASTM E10 ASTM E92 ISO 6507-1	Consensus Value from Participants
Brass Test Blocks	Hardness: Rockwell B Scale	ASTM E18	Consensus Value from Participants
Titanium Cylinders	Alpha Case Depth	ASTM E3 ASTM E407	Consensus Value from Participants
Steel Cylinders	Case Depth	SAE J423 SAE J78	Consensus Value from Participants
Stainless Steel Cylinders Inconel Cylinders	Grain Size	ASTM E3 ASTM E407 ASTM E112 ASTM E1382	Consensus Value from Participants
Inconel	Alloy Depletion Depth	ASTM E3 ASTM E407	Consensus Value from Participants

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Fasteners and Metals: Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Steel Test Blanks	Charpy V-Notch	ASTM E23	Consensus Value from Participants

Forensic: Anthropology

Program Area	Program Description	Procedure for Establishing Assigned Value
Determination of Human or Non-Human Remains, Determination of Medicolegal Significance / Digital Images	Visual Inspection	Consensus Value from Participants
Biological Profile / Measurements	Metric and Non-Metric Analysis of Bones	Consensus Value from Participants

Forensic: Scene Investigation

Program Area	Program Description	Procedure for Establishing Assigned Value
Bloodstain Pattern Analysis / Reproductions of Originals	Angle of Impact Determination Pattern Recognition, Identification, and Description	Consensus Value from Participants
Latent Prints Fingerprint Development / Materials with original depositions	Latent Print Processing Latent Print Development	Consensus Value from Participants
Body Fluid Screening / Blood, Semen, Saliva or Other Dried Fluid samples	Body Fluid Screening Body Fluid Identification	Consensus Value from Participants
Shooting (Incident) Reconstruction / Material with bullet hole(s) (Entry/Exit)	Horizontal / Vertical Angle Determination Angle Directionality (Trajectory) Entry/Exit Hole Identification	Consensus Value from Participants
Crime Scene Processing / Mock Crime Scene with Evidence Items	Crime Scene Processing, Documentation, Sketching, Photography, Evidence Processing, Evidence Collection	Value Determined Based on Observations during Crime Scene Event and Original Scene Set-up

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Forensic: Digital and Video/Imaging Technology and Analysis & Facial and Iris Identification

Program Area	Program Description	Procedure for Establishing Assigned Value
Computer Forensics, Mobile Forensics, External Storage Media / Extracted Image Files, Physical Media	Evidence Acquisition Evidence Preservation Evidence Analysis (Windows Registry, File Systems, Geo-location, Database Analysis, Data Carving) Physical Media Extraction and Analysis	Consensus Value from Participants
Video Forensics	Evidence Preservation Evidence Analysis Location and Tracking Image Extraction	Consensus Value from Participants Evaluation of Evidence Enhancement
Audio Forensics	Evidence Preservation Evidence Analysis Location and Tracking Image Extraction	Consensus Value from Participants Evaluation of Evidence Enhancement
Facial Identification	Facial Comparisons	Consensus Value from Participants

Forensic: Seized Drugs Analysis

Program Area	Program Description	Procedure for Establishing Assigned Value
Controlled Substances / Illicit or Prescription Drugs / Chemicals or Botanicals (e.g. Cannabis) Synthetic Compounds	Qualitative Analysis Quantitative Concentration/Purity Analysis	Consensus Value from Participants

Forensic: Firearms and Toolmarks

Program Area	Program Description	Procedure for Establishing Assigned Value
Firearms Analysis (Examination) / Fired Bullets, Cartridge Cases (Casings) (FCC), Projectiles	Examination Comparative Analysis	Consensus Value from Participants
Toolmark Analysis (Examination) / Tools and Substrates	Examination Comparative Analysis	Consensus Value from Participants
Serial Number Restoration (SNR) / Obliterated Stamped Bar Stock	Serial Number Restoration Chemical and/or Magnetic Preparation Methods	Consensus Value from Participants

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Forensic: Firearms and Toolmarks

Program Area	Program Description	Procedure for Establishing Assigned Value
Gunshot Residue (GSR) Distance Determination / Original or Reproductions of Unknown Residue Shot Patterns and Reproductions of Known Residue Shot Patterns	Modified Griess Chemical Processing Sodium Rhodizonate Chemical Processing Muzzle to Target Distance Determination	Consensus Value from Participants
Shooting (Incident) Reconstruction / Material with bullet hole(s) (Entry/Exit)	Horizontal / Vertical Angle Determination Angle Directionality (Trajectory) Entry/Exit Hole Identification	Consensus Value from Participants

Forensic: Biology (DNA) and Serology

Program Area	Program Description	Procedure for Establishing Assigned Value
Body Fluid Screening / Blood, Semen, Saliva or Other Dried Fluid samples	Body Fluid Screening Body Fluid Identification	Consensus Value from Participants
DNA Analysis / Blood, Semen, and/ or Saliva samples Electropherograms	STR (Autosomal) Analysis YSTR Analysis Mitochondrial DNA (mtDNA) Analysis DNA Interpretation Massively Parallel Sequencing Probabilistic Genotyping	Consensus Value from Participants
DNA Analysis of Parentage or Relationship / Blood and/or saliva samples Paper Challenge	STR (Autosomal) Analysis YSTR Analysis DNA Interpretation Relationship Associations and Statistical Calculations for Paternity and/or other Kinship Types	Consensus Value from Participants

Forensic: Latent Prints and Imprint / Impressions Evidence

Program Area	Program Description	Procedure for Establishing Assigned Value
Latent Print Examination Fingerprint Comparison / Reproductions of Originals	Comparative Analysis	Consensus Value from Participants
Latent Prints Fingerprint Development /	Latent Print Processing Latent Print Development	Consensus Value from Participants

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Forensic: Latent Prints and Imprint / Impressions Evidence

Program Area	Program Description	Procedure for Establishing Assigned Value
Materials with original depositions		
Tenprint Database Examination Fingerprint Comparison / Digital Images	Comparative Analysis Evaluation with Database/Software tools	Consensus Value from Participants
Footwear Imprints Shoe Impressions / Reproductions of Originals	Comparative Analysis	Consensus Value from Participants
Tire Track Imprints Tire Tread Impressions / Reproductions of Originals	Comparative Analysis	Consensus Value from Participants

Forensic: Document Examination

Program Area	Program Description	Procedure for Establishing Assigned Value
Questioned Documents / Original Materials	Comparative Analysis Ink Identification, Indented Writing, Type set, Printing Process Identification	Consensus Value from Participants
Handwriting Samples Handprinting and Signature Exemplar Comparison / Reproductions of Originals	Comparative Analysis	Consensus Value from Participants

Forensic: Toxicology

Program Area	Program Description	Procedure for Establishing Assigned Value
Blood Alcohol Analysis / Alcohol in Blood	Quantitative Analysis to determine Alcohol content in Blood	Consensus Value from Participants
Drug Analysis / Drugs / Metabolites in Urine or Blood	Qualitative and/or Quantitative Analysis of Drug content in Urine or Blood	Consensus Value from Participants
Breath Alcohol Analysis / Ethanol Solution	Quantitative Analysis to determine Alcohol content in Breath Alcohol Simulation Solution	Consensus Value from Participants

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Forensic: Toxicology

Program Area	Program Description	Procedure for Establishing Assigned Value
Breath Alcohol Analysis / Dry Gas Cylinders	Quantitative Analysis to determine Alcohol content in Dry Gas Reference Materials	Reference Value

Forensic: Materials (Trace)

Program Area	Program Description	Procedure for Establishing Assigned Value
Trace Analysis / Glass or Paint	Comparative Analysis	Consensus Value from Participants
Trace Analysis / Fiber	Comparative Analysis Fiber Type Identification	Consensus Value from Participants
Trace Analysis / Adhesive Tape	Comparative Analysis Physical Match Analysis	Consensus Value from Participants
Trace Analysis / Ignitable Liquid (Flammables) Sample	Detection/Presence and Classification	Consensus Value from Participants

Paper and Paperboard: Dimensional Measurement

Description of Item	Properties Measured	Range of Property	Test Method	Procedure for Establishing Assigned Value
Printing Paper	Thickness (Caliper)	(3 to 7) mils	TAPPI T411	Consensus Value from Participants
Heavyweight Paper Packaging Paper	Thickness (Caliper)	(7 to 15) mils	TAPPI T411	Consensus Value from Participants

Paper and Paperboard: Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Printing Paper	Coefficient of Static Friction Coefficient of Kinetic Friction Folding Endurance	TAPPI T549 TAPPI T511	Consensus Value from Participants
Uncoated Printing Paper	Air Resistance / Porosity	TAPPI T460 TAPPI T547	Consensus Value from Participants

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Paper and Paperboard: Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Printing Paper Heavyweight Paper Packaging Paper	Bursting Strength	TAPPI T403	Consensus Value from Participants
Printing Paper Heavyweight Paper Packaging Paper	Tearing Strength	TAPPI T414	Consensus Value from Participants
Printing Paper Heavyweight Paper Packaging Paper	Tensile Properties	TAPPI T494	Consensus Value from Participants
Printing Paper Packaging Paper Paperboard	Bending Resistance (Gurley and Taber)	TAPPI T543 TAPPI T566 TAPPI T489	Consensus Value from Participants
Heavyweight Paper Paperboard	Z-Directional Tensile	TAPPI T541	Consensus Value from Participants
Heavyweight Paper	Internal Bonding Strength (Modified Scott Bond and Classical Scott Bond)	TAPPI T569	Consensus Value from Participants

Paper and Paperboard: Optical

Description of Item	Properties Measured	Range of Property	Test Method	Procedure for Establishing Assigned Value
Low FWA Paper	Color and Color Difference Brightness	N/A	TAPPI T524 TAPPI T527 TAPPI T452 TAPPI T525	Consensus Value from Participants
Printing Paper	Opacity	N/A	TAPPI T25	Consensus Value from Participants
Printing Paper Newsprint	Opacity	N/A	TAPPI T519	Consensus Value from Participants
Glossy Coated Paper	Specular Gloss	(50 to 95) gloss units	TAPPI T480	Consensus Value from Participants
Matte / Dull Coated Paper	Specular Gloss	(10 to 50) gloss units	TAPPI T480	Consensus Value from Participants

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Paper and Paperboard: Physical Mechanical Testing

Description of Item	Properties Measured	Range of Property	Test Method	Procedure for Establishing Assigned Value
Coated Printing Paper	Roughness	(0.5 to 4.0) µm (microns)	TAPPI T555	Consensus Value from Participants
Printing Paper	Roughness	(2.5 to 6.5) µm (microns)	TAPPI T555	Consensus Value from Participants
Printing Paper	Roughness (Sheffield) Moisture Content Grammage Hercules Sizing Test (HST)	N/A	TAPPI T538 TAPPI T412 TAPPI T410 TAPPI T530	Consensus Value from Participants

Plastics: Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Molded Bars ASTM Type 1 Tensile ISO Multipurpose	Tensile	ASTM D638 ISO 527	Consensus Value from Participants
Molded Bars ASTM Flex ISO Multipurpose	Flexural Izod Impact	ASTM D790 ISO 178 ASTM D256 ISO 180/A	Consensus Value from Participants
Molded Bars ISO Multipurpose	Charpy Impact	ISO 179	Consensus Value from Participants
Films	Tensile Tear Resistance	ASTM D882 ASTM D1922	Consensus Value from Participants

Plastics: Optical

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Films	Haze and Transmittance	ASTM D1003	Consensus Value from Participants

Plastics: Physical Chemical

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Molded Bars ASTM Flex ISO Multipurpose	Specific Gravity	ASTM D792 ASTM D1505 ISO 1183	Consensus Value from Participants

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Plastics: Physical Chemical

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Thermoplastic Pellets	Moisture Content Ash Content	ASTM D6869 ASTM D6980 ASTM D7191 ISO 15512 (B) ASTM D5630	Consensus Value from Participants
Thin Plastic Films	Coefficient of Friction	ASTM D1894	Consensus Value from Participants

Plastics: Thermal

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Molded Bars ASTM Flex ISO Multipurpose	Deflection of Temperature Under Load	ASTM D648 ISO 75 (Af)	Consensus Value from Participants
Molded Bars ASTM Flex	Vicat Softening	ASTM D1525	Consensus Value from Participants
Thermoplastic Pellets	Flow Rate, Differential Scanning Calorimetry, Thermogravimetric Analysis	ASTM D1238 ISO 1133 (A/B) ISO 11357 ASTM D3850 ISO 11358	Consensus Value from Participants

Rubber: Mechanical Testing

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Vulcanized Rubber Dumbbells	Tensile Hardness (Type A)	ASTM D412 ASTM D2240	Consensus Value from Participants
Rubber Discs	Hardness (Type D) Compression Set	ASTM D2240 ASTM D395 (B)	Consensus Value from Participants
O-Ring (Nitrile)	Tensile Hardness/ (Type A, Type M) Compression Set	ASTM D1414	Consensus Value from Participants
Participant-Cured Rubber	Tensile	ASTM D3182 ASTM D412	Consensus Value from Participants

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Rubber: Physical Chemical

Description of Item	Properties Measured	Test Method	Procedure for Establishing Assigned Value
Vulcanized Rubber Dumbbells	Density	ASTM D297	Consensus Value from Participants
O-Ring (Nitrile)	Density	ASTM D1414	Consensus Value from Participants
Rubber Polymer (e.g. SBR, NBR, Butyl)	Mooney Viscosity and Stress Relaxation (ASTM and ISO)	ASTM D1646 ISO 289	Consensus Value from Participants
Unvulcanized Rubber (EPDM)	Vulcanization Characteristics using Rotorless Cure Meter (MDR) or RPA Rheological Properties	ASTM D5289 ASTM D6204	Consensus Value from Participants

Wine: Chemical

Description of Item	Properties Measured	Procedure for Establishing Assigned Value
Wine Red, white, or blush wines	Alcohol by Volume Total Sulfur Dioxide Free Sulfur Dioxide Titratable Acidity Volatile Acidity pH Residual Sugar L-Malic Acid Glucose + Fructose Copper (Cu) Content Potassium (K) Content	Consensus Value from Participants

Wine: Optical

Description of Item	Properties Measured	Procedure for Establishing Assigned Value
Wine Red, white, or blush wines	Absorbance - A420 Absorbance - A520	Consensus Value from Participants

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Wine: Physical Chemical

Description of Item	Properties Measured	Procedure for Establishing Assigned Value
Wine Red, white, or blush wines	Specific Gravity	Consensus Value from Participants

Jason Stine, Vice President

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