

INNOVATION NETWORK



Where do textile and fiber companies go when they need a centralized source of technical support for their business? For over 70 years that place has been the Textile Technology Center in Belmont, North Carolina.

Since its inception in 1943, the Center has played a significant role in serving the North Carolina textile industry. Today, the Center serves the nation and the world. Over time, the areas of need within the textile industry have changed and evolved and the Center has remained flexible and evolved along with those needs.

The Textile Center focuses on providing testing services, product prototyping and sample production in several areas.

With state of the art equipment and capable staff, the Textile Technology Center provides quick and cost effective solutions to fiber producers, textile and apparel manufacturers and retailers most specialized needs.



North Carolina has a significant history in textile manufacturing which began in the 1820s. By 1921 North Carolina mills were producing \$191 million worth of textiles annually. This economic boom continued until the mid 1980s when low capital and wage costs lured companies to export jobs overseas. The industry was changing and many of the workers did not have the training to continue working.

In 1990 CVCC established The Hosiery Technology Center (HTC), a training center for hosiery industry workers. In 2000 the HTC opened a Standards and Testing Laboratory. In 2009, the Hosiery Technology Center changed its name to Manufacturing Solutions Center. Over the past 25 years, Manufacturing Solutions Center has become an essential part of manufacturing where innovative concepts are brought to life. The facility is used to test products and prototypes; fine-tune manufacturing processes; perform accurate cost and product studies to help manufacturers stay at the forefront of their industry.

Manufacturing & Textile

The Manufacturing and Textile Innovation Network also known as MTIN is a partnership between the Manufacturing Solutions Center and the Textile Technology Center. We are located in Western North Carolina and serve companies within the US and around the world. We are leading the way in providing solutions for manufacturing and textile processes and advancement.

Manufacturing and Textile Innovation Network's (MTIN) vision is to create an end-to-end matchless resource for textile and structural furniture testing, prototyping, applied research and development, business incubation, and training.

The Manufacturing and Textile Innovation Network along with the respective Colleges, Catawba Valley Community College and Gaston College have formed a unique partnership that allow both Centers to operate in coordination with each other to provide, among other things, better support to their respective clients, expand services to other related industries, and provide more opportunities for research and development. Our operational partnership of the two Centers benefit the Centers, industry customers, the textile and manufacturing industries, and our respective communities. Our network serves as another economic development resource for the region and State of North Carolina. Check out Manufacturing Solutions Center and Textile Technology Center services!



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MELT EXTRUSION LABORATORY

Where the creation of synthetic fibers begins. From polymer to chip to fiber. From fiber to yarn, then fabric, melt extrusion is the start of seeing your sample come to being. With small run capabilities, see if your formulation will translate well when implemented at your own mill or plant; minimizing your investment risk. Let the Textile Center's Melt Extrusion Laboratory be your lab for perfecting your project from its start!

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Melt Spinner (Large Extruder)

Single line multi-filament melt extruder.

Melt Spinner (Small Extruder)

Staple Draw Line

Processes filament fiber into cut staple with 2 draw lines, crimper, drying oven and cutter.

Fiber Drawing

Single thread line, four heated rolls

Fiber Cutting

Cuts drawn uncrimped fiber into staple, 1/2" to 7".

Chip Drying

Dessicate up to 180 pounds. Vacuum up to 250 pounds.

Reacter

2 Liter Batch Autoclave includes cleanout/wash batch.

One Shot Extruder Includes clean up

Air Jet Texturing

BCF Texturing

False Twist Texturing





YARN PROCESSING

With as little as 100 grams of your fiber, the Textile Center's Yarn Processing Department can spin it into the yarn of your choice. Offering short and long staple options, the center supports both the synthetic and natural fiber industries.

Don Rusch | 704.825.6264 | rusch.don@gaston.edu Chuck Costner | 704.825.6270 | costner.chuck@gaston.edu

Short Staple Processing (30 to 250 pounds)

Hollingsworth Hopper Blend Line

Opens bales of fiber; weighs and blends to specific ratios. Used for natural and synthetic fibers.

Trutzschler LVSA Fine Opener

Opens fiber and stores it for fiber regulation and control.

Trutzschler FBK 760 Card

Cards short staple fibers. Operates using a single licker-in. Semi-worsted system, mid to long staple fibers.

Trutzschler DK 903 Card

Cards short staple fibers. Operates using triple licker-ins within rollertop card.

Reiter RSB 851 Draw Frame with Autoleveller

Used to draw sliver to improve evenness and achieve desired grain weight.

Saco-Lowell Rovamatic with Speed Controls

Processes sliver into roving for ring spinning.

CSM Ring Spinning Frame

Capable of producing a wide range of yarn counts.

Muratec MVS

Vortex Spinning Frame.

Schlafhorst SE-11 Autocoro

Open End spinning frame.

SSM Doubler

Plys together two to three packages.

Muratec Link Coner

Winds ring spun yarn that is packaged on bobbins onto larger packages.

Galan PR166/9 - Doubling and Ring Twisting Machine

Ring Twister offers flexibility for small to medium scale productions.

Agteks Directwist 2C10 - Multi-Function Twisting Machine

Symtech SSM Xeno YD with Digicone 2 Fastflex Technology

Winder for monofilament, textured filaments, technical yarns, assembly winding.

Xorella XO-Mini

Textile conditioning machine with treatment temperatures up to 140C.

Lab Scale Processing (100 grams) Uster MDTA Rotoring

Produces sliver that can be used to create an Open End or Ring Spun yarn.

Pinter 24- Position Ring Spinning Frame

Capable of spinning long staple and fine counts.



FABRIC FORMATION

Starting with a CCI Sample Weaving System, The Fabric Formation Department is capable of sizing, warping and weaving fabric from a single package. The ability to warp using up to six different packages, using any fiber type! Fabric Formation also offers knitting services, from small tubular knit samples to larger jersey knits requiring as few as 24 packages.

Lee Allison | 704.825.6262 | allison.jeffrey@gaston.edu Kelly Brown | 704.825.6290 | brown.kelly@gaston.edu

CCI Sample Weaving System

This is a set of three separate machines that are capable of sizing, warping and weaving fabric from a single package. The machine is able to warp using up to six different packages. Any fiber type will work on this machine. Weaves any 18 body harness dobby design.

CCI Sample Weaving System

Itema Rapier Weaving System

Forty yard broadcloth sample in any dobby weave.

Circular Knitting Projects



DYEING LABORATORY

From diagnostic dyeing and colorfastness evaluation to shade matching, the Dye Laboratory's capabilities can be performed on fiber, yarn and fabric samples.

Jerome Harris | 704.825.6268 or 704.825.6285 | harris.jerome@gaston.edu

Colorfastness to Laundering, Home and Commercial: Accelerated (AATCC 61)

Launderometer / Ahiba Nuance Colorfastness to Water (AATCC 107)

Coloriastness to water (AATCC TO

Merge Checks Competitive and Comparative.

Dye Puffs/Fabric

Dye Re-level

Pre-Treatment and After-Treatment

- **Pressure Level**
- Washing Accelerated
- Strip/Re-dye

Scour

V-Value for Polyester

Gaston County Futura Jet Gaston County Package Machine Scour Gaston County Mini-Lab Jet Ahiba Skein Dyer Single Dip Padder Single Dip Padder Usage







ANALYTICAL CHEMISTRY LABORATORY

Using techniques that involve separation, identification and quantification, the Analytical Laboratory determines the identity and quantity of chemical components within a sample.

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ICP

Standard Element List-Standard Preparation (Acid Digestion or Ash) Elements available include (any and all can be reported at the specified rate):

Silver, Aluminum, Arsenic, Beryllium, Bismuth, Calcium, Cadmium, Cobalt, Chromium, Copper, Iron, Potassium, Lithium, Magnesium, Manganese, Molybdenum, Sodium, Nickel, Phosphorous, Lead, Antimony, Selenium, Strontium, Thallium, Titanium, Vanadium and Zinc.

GC

Standard PET preparation and analysis only (Any other GC analysis must be quoted individually and test methods provided where applicable.)

GC/MS

As required

DSC

Standard melt point and transitions.

DSC- Multiple Cycle

Multiple cycle heat and cool based on specific instructions included in the initial request.

DSC- Heat History

Heat history analysis of yarn, fiber and fabric in triplicate.

UVVis

Quoted per request dependent on requirements.

Ash Content

Per request duplicate analysis.

Moisture

Standard evaporative analysis of polymer moisture (n=1).

Loss on Drying

Standard evaporative analysis of polymer moisture (n=2).

% Finish (Extractables)

Polar and non-polar extraction using methanol/hexanes.

% Finish (Extractables)

Finish analysis with hexanes and methanol data separated by solvent.

Special Finish Analysis

Finish extraction with non-standard solvents/techniques quoted individually.

Complete Finish Analysis

Finish extraction and analysis of residue by FTIR. Additional charge if EDX and/ or GCMS required.

Blend Analysis

Per polymer - i.e., remove cotton = 1 sample, remove PET = 1 sample

Dissolve Out

Per polymer.

FTIR

Normal Prep: Special handling will be quoted.

pH Determination

This test determines the pH of wet processed textiles.

Relative Dye Standard PET method w/HFIP.

Surface Oligomers Standard Method - UVVis.

Total Oligomers Standard Method - UVVis.

Consultation

Analytical Priority Assignment

Standard Service: Completion within 15 working business days

Express Service: Completion within 5 working business days 50% surcharge

Priority Service: Completion within 1-2 working business days 100% surcharge



FLAMMABILITY LABORATORY

Jim Taft | 704.825.6298 | ttcmicro@yahoo.com

Flammability Vertical Burn

(ASTM D6413) Standard Test Method Flame Resistance of Textiles. The purpose of this test is to determine whether a fabric will continue to burn after the source of ignition is removed.

Flammability Vertical Burn (Draperies)

NFPA 701: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films. Drapery fabric is tested by burning a small sample and measuring the flame, char length and flaming residue.

TPP (Thermal Protective Performance) Flammability

(ASTM F2700) Standard Test Method for Unsteady-State Heat Transfer Evaluation of Flame Resistant Materials for Clothing with Continuous Heating. This test method is intended for the determination of the heat transfer performance value of a material, a combination of materials, or a comparison of different materials used in flame resistant clothing for workers exposed to combined convective and radiant thermal hazards.

Flammability Sample Prep



MICROSCOPY LABORATORY

The microscopy lab has a very talented staff that is trained to get the most out of the equipment which includes stereo, compound, scanning electron microscopes and more. These tools are often used for imaging, identification, reverse engineering and problem solving.

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Bicomponent/Hollow Fiber dpf

Similar to determining fiber dpf, uses the weight percent of each component.

Chemical Extraction

Water, alcohol, hexanes, acetone and xylene for contamination investigation.

Chemical Extraction (HFIP gel analysis)

Chemical extraction typically involving 0.05 milliliters or less of solvent.

Cotton Maturity Detection

Contamination Identification

The lab is skilled at contamination identification by combining sample manipulation, polarized light, microscope infrared, hot stage, and energy dispersive x-ray analysis techniques to identify contaminants.

Crimp per inch by image analysis (n=30)

Cross-section

Digital image of fiber, yarn or multilayer film cross-section.

Data Compilation

The compilation of data for all imaging and problem solving projects

Density Column

Fiber or yarn – n=3 / Chip – n=10 / Bottle Flake – n=1

EDX

Identification of elements (carbon and heavier) lowest level of detection 2000ppm.

EDX Mapping

Epoxy Cross-section

This technique is used to cross-section high strength yarns such as Paraaramid.

Failure Analysis

Root cause failure analysis (i.e., Did the sample fail from stress overload, brittle fracture, environmental stress cracking, chemical attack, etc.) This does not include the cost of contaminant identification.

Fiber Birefringence Fiber dpf or Bicomponent/Hollow

Calculate fiber dpf by using image analysis to measure the fiber cross-sectional area.



Fiber Identification

Unknown fibers are identified by using a combination of microscopy infrared and cross section analysis. Additional testing may be required such as hot stage and EDX at an additional cost.

Fiber Shrinkage by Hot Stage

Fiber shrinkage determined by Mettler Hot stage and Image Analysis.

Fiber ID Stain

Gross determination of fiber types in an unknown sample.

Filament Count by Image Analysis

(Additional \$80 per hour for 100+ filament yarns if necessary) Yarn cross-section via thin sectioning device.

Freeze Fracture

Prepares foamed samples for SEM imaging.

Hot Stage Analysis

The lab has a Mettler hot stage. The hot stage can be thought of as Differential Scanning Calorimetry with images instead of a thermal analysis plot.

Mod Ratio & DPF

Similar to determining fiber dpf with the addition of mod ratio also being calculated.

Microscopic Infrared Analysis

The lab has an IlluminatIR II for doing microscope ATR or ARO analysis.

Nonwoven Blend

The lab is skilled at reverse engineering nonwoven fabrics. The lab can identify each fiber type and the type of binder. The analysis and quantification of a binder can be determined at an additional cost.

Optical Imaging

Optical microscopy includes stereo zoom compound microscopy.

Pyrolysis

Sample prep for elastomeric materials.

Sample Examination Fee

Sample investigation- minimum fee for all samples submitted for problem solving.

Scanning Electron Microscopy

The Amray 1820 is a conventional high vacuum SEM. This unit has EDXRA energy dispersive x-ray analysis capabilities.

Sample Prep and Manipulation

This fee is for non-routine sample prep such as unraveling a warp knit or manipulating 5 micron particles.

Yarn Blend Analysis (2 fiber types) or comparing normal v defect

Microscopy techniques are used to determine blend analysis when analytical techniques (i.e., dissolve out) cannot be used. Examples of when analytical techniques cannot be used are a heather blend of black and white polyester or a blend of cotton and rayon.

Microscopy Priority Assignment

Standard Service: Completion within 15 working business days

Express Service:

Completion within 10 working business days 50% surcharge

Priority Service:

Completion within 5 working business days 100% surcharge



PHYSICAL TESTING LABORATORY

The Textile Center has two physical testing labs that house over \$1 million worth of equipment that make it possible to perform a wide variety of physical testing on fibers, yarns and fabrics.

Fibers can be singled out and analyzed for size, breaking strength, elongation, staple length and other attributes.

Fabrics can be analyzed for content and construction by breaking them down into yarn or fiber form and running tests or they can be tested in fabric form for ball burst, tear strength, pilling, shrinkage and more. In addition we can analyze the fabric and determine the weave or knit patterns used to produce the fabric.

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FIBER TESTING

AFIS

(ASTM D5866) Advanced Fiber Information System, provides an improved method of collecting fiber information on fiber quality. It measures "single" fibers and provides data and distributions of measured properties for length and neps.

Classifiber

Classifiber is a fiber length distribution tester for short natural and synthetic fibers up to 80mm.

Crimp per inch

(ASTM D3937) This test for determination of crimp frequency of manufactured staple fibers may be used for the acceptance testing of commercial shipments.

Favimat Fiber Breaks

(ASTM D1577) Favimat is a semiautomatic controlled tensile tester which works according to the principle of constant rate of extension with integrated measuring head for fineness measurement.

Fiber Diameter Synthetic (DPF)

Denier per Filament or DPF is the method which covers the determination of denier to all types of yarn with less than 5% stretch.

Moisture Balance

(ASTM D4120) This method is used to measure the amount of time it takes for water to dissipate from fabric.

Rotor Ring

This Rotor Ring instrument measures fiber-to-fiber and fiber-to-metal opening energy to monitor changes in staple fiber cohesion.

Staple Length

(ASTM D5103) This method covers the determination of average staple length and staple length distribution of both manufactured and natural fibers by manually measuring single fiber length.

YARN TESTING

Boiling Water Shrinkage

(ASTM D2259) This test method covers the measurement of shrinkage of yarns that has been exposed to boiling water. Skeins are made from yarn and immersed into boiling water. Skeins are reconditioned and measured for shrinkage.

Hot Air Shrinkage

(ASTM D2259) This test method covers the measurement of shrinkage of yarns that has been exposed to hot air. Skeins are made from yarn and exposed to dry heat. Skeins are reconditioned and measured for shrinkage.

Instron Yarn Breaks single end (n=10)

(ASTM D2256) This test conditions for determining the tensile properties of yarns using the singlestrand method.

Node Count

This method determines a node count in a filament yarn.

Short Length Denier (From Fabric)

(ASTM D1059) This test method covers the determination of the yarn number taken from any textile fabrics in which the yarns are intact and can be removed in measurable lengths. Because this method is based on short-length specimens, the results should only be considered as approximations of the yarn number.

Skein Breaks (Instron)

(ASTM D1578) This test covers the determination of the breaking strength of yarn in skein form. The observed breaking strength is expressed in units of force and equations are provided to convert breaking strength to skein breaking tenacity and to skein break factor.

Spinning Process ID

Determine how the yarn is spun. Ring, Open End or Air Jet. For novelty yarns see Microscopy Laboratory.

Staff Shedding Test

Measures the lint generated by action of yarn against yarn.

Statimat

(ASTM D2256) This test method covers the determination of tensile properties of monofilament, multifilament and spun yarns.

Twist per Inch-Plied

(ASTM D1422) This test method covers the determination of the twist of the plied yarns and the twist of the single yarn before plying.

Twist per Inch-Singles

(ASTM D1422) This test method covers the determination of the amount and direction of twist at the completion of any stage of twisting in single (spun or filament) yarns.

(Roving/Silver/Staple)

Determines the number of imperfections in a yarn. It provides statistical evaluations of polyester blended yarns for classification of evenness, thickness, thinness as well as neps.

Yarn Denier/Count

(ASTM D1907) This test covers the determination of the yarn number of all types of cotton, woolen, worsted, and manmade fiber yarns taken from packages; or from any textile fabrics in which the yarns are intact and can be removed in measurable lengths.

FABRIC TESTING

Air Permeability: \$45/sample

(ASTM D737) This test method covers the measurement of the air permeability of textile fabrics. It applies to most fabrics including woven fabrics, nonwoven fabrics, air bag fabrics, blankets, napped fabrics, knitted fabrics, layered fabrics and pile fabrics. The fabrics may be untreated, heavily sized, coated, resin-treated or otherwise treated.

Absorbency

(AATCC 79) This test method is designed to measure the water absorbency of textiles by measuring the time it takes a drop of water placed on the fabric surface to be completely absorbed into the fabric.

Ball Burst

(ASTM D6797) This test method describes the measurement for bursting strength of woven and knitted textiles taken from rolls of fabric or fabric taken from garments.

Computer Color Measurement

The Color Eye specializes in color management and color communication L,a,b technology. It offers digital solutions for color management, color matching, quality control and color communication from production to marketing.

Crocking

This test method describes the transfer of color from one fabric onto another white test fabric. It is to test improper dyeing, poor penetration or poor fixation.

Cut TDM100

(ASTM F2992-15) This test method covers the measurement of the cut resistance of a material when mounted on a mandrel and subjected to a cutting edge under a specific load.

Elmendorf Tear

(ASTM D1424) A pendulum impact tester is used to measure the force required to propagate an existing slit a fixed stance to the edge of the test sample.

Fabric Appearance

(AATCC 124) This test method is designed to evaluate the smoothness appearance of flat fabric specimens after repeated home laundering.

Fabric Construction Analysis

Visual determination of weave process, fabric weight, fabric thickness, thread count/courses and wales, and denier.

Fabric Weight

(ASTM D3776) These test methods cover the measurement of fabric mass per unit area (weight) and is applicable to most fabrics.

FAK Sampler Knitting Machine

Knits sample sizes in tubular knit with one cone of yarn. The yarn can be of any type.

General Physical Testing Prep

If additional preparation is necessary to complete primary testing.

Grab Strength

(ASTM D5034) This test method covers the grab and modified grab test procedures for determining the breaking strength and elongation of most textile fabrics.

Home Laundering 5 wash

Five Home Laundering washings in standard washing machine.

Plastic Replica

Determine if defects in a fabric such as streaks and barre are caused by physical or dye defects.

Random Tumble Pilling

(ASTM D3512) This test method covers the resistance to the formation of pills and other related surface changes on textile fabric.

Ring Pull

Mechanical test that quantifies hand of a fabric.

Seam Slippage

(ASTM D4034) Used to determine either the sewn seam strength of textiles or the efficiency of a seam assembly with any given fabric.

Shrinkage (Fabric)

(AATCC Test Method 135) This test method is intended for the determination of dimensional changes of fabrics when subjected to home laundering procedures used by consumers.

Static Dissipation

(ATSM D4865) This is a measure of the amount of time it takes for static to dissipate from a fabric strip or staple fabric.

Strip Strength

(ASTM D5035) This test method covers raveled strip and cut strip test procedures for determining the breaking force and elongation of most textile fabrics. Provision is made for wet testing.

Thickness

(ASTM D1777) Covers the measurement on the thickness of most textile materials.

Thread Count

(ASTM D3775) The measurement of warp end count and filling pick count and is applicable to all types of woven fabrics.

Tongue Tear

(ASTM D2261) This test method covers the measurement of the tearing strength of textile fabrics by the tongue (single rip) procedure.

Trapezoid Tear

(ASTM D4533) This test method is an index test used to measure the force required to continue or propagate a tear in woven or non-woven geotextiles by the trapezoid method.

Twist per Inch (Fabric)

(ASTM D1422) This test determines the amount and direction of twist at the completion of any stage of twisting in single (spun or filament) yarns taken from fabrics.

Vertical Wicking

(AATCC Test Method 197) This test method is used to evaluate the ability of vertically aligned fabric specimens to transport liquid along and/or through them, and is applicable to woven, knitted or nonwoven fabrics.

Whiteness Measurement

(AATCC Test Method 110) This test method provides procedures for measuring the whiteness and tint of textiles.

Martindale Abrasion (1st 15,000 cycles*)

(ASTM D4966) This test method covers the determination of the abrasion resistance of textile fabrics abraded against crossbred, worsted wool fabric.

Tabor Abrasion (1st 15,000 cycles*)

(ASTM D3884) This test method covers the determination of the abrasion resistance of organic coatings to abrasion produced by the Tabor Abraser on coatings applied to a plane, rigid surface, such as a metal panel.

Wyzenbeek (1st 15,000 cycles*)

(ASTM D4157) This test method covers the determination of the abrasion resistance of woven textile fabrics using oscillatory cylinder tester. The specimen is abraded using cotton duck #10 and evaluated visually.

Physical Testing Priority Assignment

Standard Service:

Completion within 15 working business days

Express Service:

Completion within 10 working business days 50% surcharge

Priority Service:

Completion within 5 working business days 100% surcharge



FABRIC & YARN ANALYSIS LABORATORY

The Fabric and Yarn Analysis Laboratory has a talented staff adept at analyzing fiber, yarn and fabric defects. They have numerous tools and resources at their disposal to aid in this very challenging type of analysis.

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Cross Section

Yarn and fiber identification and analysis per cross section.

Defect Analysis Sample Exam Visual analysis and defect determination.

Fabric Construction Visual determination of weave process.

Filament Count Determine filament count.

Hot Air Shrinkage Percent yarn shrinkage.

Knit Extension Measures the tightness and looseness of a yarn within a knitted fabric.

Plastic Replica

Determines if defects in a fabric such as streaks and barre are caused by physical or dye defects.

Pressure Level Supplemental dye lab procedure for defect determination.

Sample Prep

Separate normal and defect for woven and knit.

Scrim Analysis

Analysis comparison of one fiber component to the other in an intimate blend.

Short Length yarn denier from fabric

This method covers the determination of the yarn taken from any textile fabrics in which the yarns are intact and can be removed in measurable lengths. Because this method is based in short length specimens, the results should only be considered as approximations of the yarn number.

Staple Length from fabric

This method covers the determination of average staple length and staple length distribution of both manufactured and natural fibers by manually measuring single fiber length.

Twist per inch (from fabric)

This test determines the amount and direction of twist at the completion of any stage of twisting in single (spun or filament) yarns taken from fabrics.

Unravel Warp Knit or fabrics with spandex

Fabric deconstruction, usually for further analysis.

Weave Extension

Measures the tightness and looseness of a yarn within a woven fabric.

Fabric and Yarn Analysis Priority Assignment

Standard Service: Completion within 15 working business days

Express Service: Completion within 10 working business days 50% surcharge

Priority Service:

Completion within 5 working business days 100% surcharge





The Manufacturing Solutions Center can prototype fabric products with new/novel yarns and on the market yarns to create new fabrics/products using circular hosiery and Santoni knitting machines as well as flatbed knitting machines.

Hosiery

Rodney Sigmon | 828-327-7000 ext. 4144 | rsigmon@manufacturingsolutionscenter.org Santioni & Flatbed

Alex Cranston | 828-327-7000 ext. 4101 | acranston@manufacturingsolutionscenter.org

Hosiery Knitting

Prototyping capabilities using small diameter sock knitting equipment. We work with entrepreneurs to develop their ideas into products and we assist manufacturers to evaluate and enhance their product lines. We also have finishing capabilities such as steaming and boarding.

Machine Specs:

- 4 inch, 9 gauge
- 3 ¾ inch, 14 gauge
- 3 ¾ inch, 22 gauge

Santoni Seamless Circular Knitting

Prototyping on Santoni circular seamless knitting machines to make seamless garments such as active apparel, shape wear, athleisure, and more.

Machine Specs:

• 15 inch, 28 gauge, 8 feeds (minimum of 4)

Flatbed Knitting

Prototyping on flatbed knitting machines to create an array of products due to the nature of flatbed knitting which has shaping capabilities. This is useful for knit and wear garments and helps to eliminate cut and sew steps and cuts down on waste in general. Also used to develop technical fabrics such as shoe uppers, face masks, spacer fabrics, etc.

Machine Specs:

• 3.5, 7, and 14 gauge

Agteks Yarn Machine

Twisting, Covering, Back Winding



NON-TEXTILE PRODUCT DEVELOPMENT, CNC ROUTING, 3D MODELING, 3D PRINTING

We can turn ideas into full-scale reality using CAD software and develop non-textile related (rubber, plastic, wood, metal, etc.) prototypes.

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PPE TESTING

We offer and can perform a multitude of standard test methods for fabrics and textile related products.

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Water Resistance: Impact Penetration Test

Measures the resistance of fabrics, seams (lengthwise), and ties to impact of water. AATCC 42*

Water Resistance: Hydrostatic Pressure Test (fabric, seams-lengthwise, and ties) Measures the resistance of fabrics, seams (lengthwise), and ties to penetration of water under hydrostatic pressure. AATCC 127*

Resistance of Protective Clothing to Penetration of Synthetic Blood ASTM 1670/F1670M*, ANSI/AAMI PB70*

Break Strength & Elongation of Fabrics – Grab Test ASTM D5034*

Tear Strength of Fabrics – Trapezoid Procedure ASTM D5587*

Tear Strength of Non-Woven Fabrics – Trapezoid Procedure ASTM D5733*

Seam Strength of Gowns Tests for failure in sewn seams of gowns or other woven fabrics. ASTM D1683*

Breaking Strength – Grab Test of Coated Fabrics ASTM D571 Sections 12-15; Procedure A

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Seam Strength – Coated Fabrics ASTM D571 Sections 71-76

Moisture Vapor Transmission (MVTR) of Materials

ASTM E96 Procedures A (Desiccant Method) & B (Water Method)

Abrasion Resistance of Fabrics – Martindale ASTM D4966 Option 1: Hole in Knits or Ends Break in Wovens

Flammability of Wearing Apparel 16 CFR 1610/ASTM D1230**

Repeated Home Laundering AATCC LP1

Repeated Industrial Laundering ISO 15797

Resistance of Medical Face Masks to Penetration by Synthetic Blood ASTM F1862

Air Permeability of Fabrics AATCC M14, ASTM D737



UPHOLSTERY TESTING

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Abrasion Resistance: Wyzenbeek

Measures the abrasion resistance of woven textiles by counting the number of double rub cycles achieved before two yarn breaks occur or noticeable wear. ASTM D4157, AHFA JIFS&G Ch. 1 or ASTM D4157 – ACT

Abrasion Resistance: Martindale

Measures the abrasion resistance of a fabric by counting the number of cycles endured before the fabric shows change in appearance. ASTM D4966 – ACT

Pilling Resistance

Determines resistance to pilling of a fabric. ASTM D3511 (Brush Pill), ASTM D4970/D4970M – ACT (Martindale)

Seam Slippage

Measures the resistance to fabric yarn slippage in determining the movement of yarns in a fabric when pulled apart at a seam. ASTM D4034 – ACT, ASTM D434, ASTM D3597 – ACT

Seam Break Strength

Measures the sewn seam strength of a fabric. ASTM D3597 – ACT, ASTM D1683, AHFA JIFS&G Ch. 21

Break Strength & Elongation of Fabrics Using the Grab Test

ASTM D5034*, AHFA JIFS&G Ch. 26*, ASTM D5034 – ACT*

Tear Strength of Fabrics by Tongue Tear Procedure: Single Rip

Measures the tear strength of fabrics, specifically knit upholstery. ASTM D2261, AHFA JIFS&G Ch. 25

Tear Strength of Fabrics by Trapezoid Procedure

Used for tricot knit constructions. ASTM D5587-08*, AHFA JIFS&G Ch. 25*

Elongation: Woven Upholstery Fabric

AHFA JIFS&G Ch. 10

Colorfastness to Crocking

Determines the amount of color transferred from the surface of a textile material to another surface by rubbing. AATCC 8, AHFA JIFS&G Ch.5. AATCC 8-ACT

Colorfastness to Water

Measures the resistance to water of colored upholstery fabrics. AATCC 107, AHFA JIFS&G Ch. 4

Colorfastness to Solvents

Measures the resistance to solvents of colored upholstery fabrics. ASTM D3597-6.7, AHFA JIFS&G Ch.4

Colorfastness to Light

AATCC 16, AHFA JIFS&G Ch. 6, AATCC 16.3 - ACT

Dimensional Stability to Water

Dimensional stability of woven and knit upholstery fabrics after exposure to water. AHFA JIFS&G Ch. 9

Yarn Count

Measurement of picks per inch of woven fabrics. ASTM D3775, AHFA JIFS&G Ch. 15

Determination of Number of Threads Per Unit Length: Woven Fabrics CAN/CGSB-4.2 No. 6-2013

Fiber Migration in Fabrics

AHFA JIFS&G Ch. 27



COLORFASTNESS TESTING

Determining a material's color's resistance to fading or running.

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Colorfastness to Chlorine Bleach AATCC/ASTM TS-001, AATCC 61 5A

Colorfastness to Sodium Hypochlorite Bleach in Home Laundering AATCC 188

Colorfastness to Crocking AATCC 8, ISO 105-X12:2001, CAN/CGSB 4.2 No. 22-2004

Colorfastness to Laundering: Accelerated AATCC 61, ISO 105 C-06:1994, CAN/CGSB 4.2 No. 19.1-2004 (#2)

Colorfastness After Actual Home Laundering AATCC/ASTM TS-007

Colorfastness to Light: Xenon Arc AATCC 16e or 3 or 16.3, ISO 105-B02: 1994, CAN/CGSB 4.2 18.3-97

Colorfastness to Non-Chlorine Bleach AATCC/ASTM TS-001, AATCC 172

Colorfastness to Perspiration AATCC 15, ISO 105-E04:1994, CAN/CGSB 4.2 No. 23-M90

Colorfastness to Saliva DIN V 53160-1 2002

Colorfastness to Water AATCC 107, ISO 105-E01:2010, CAN/CGSB-4.2 No. 20-M89

Colorfastness to Solvent Spotting: Perchloroethylene AATCC 157

Colorfastness to Solvent AATCC 107, ASTM D3597

Colorfastness to Sea Water AATCC 106

Colorfastness to Water Spotting AATCC 104

Colorfastness to Perspiration and Light AATCC 125

*Accredited ISO/IEC 17025, **Accredited CPSIA/ISO/IEC 17025

Colorfastness: Dye Transfer in Storage AATCC 163

Colorfastness to Dry Cleaning AATCC 132



COMPRESSION TESTING

Shane Lynch | 828-327-7000 ext. 4146 | slynch@manufacturingsolutionscenter.org

Graduated Hosiery Compression

Method for the compression and stiffness of graduated compression hosiery, anti-embolism hosiery, and graduated support hosiery. BS661210:2018, MSC-117



ABRASION RESISTANCE TESTING

Shane Lynch | 828-327-7000 ext. 4146 | slynch@manufacturingsolutionscenter.org

Abrasion Resistance

Determine the abrasion resistance of textiles. ASTM D4966, ISO 12947-2:1998, ISO 12947-3:1998, THA Martindale Abrasion Method, BS3424-24: 1990 Method 27A



PILL AND SNAG TESTING

Determination of the propensity of a fabric to form pills, snags, and other related surface changes on textiles.

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Pilling Resistance: Random Tumble Pill Tester ASTM D3512/D3512M, CAN/CGSM-4.2 No, 51.2-M87, ISO 12945-3:2014(E)

Pilling Resistance: Martindale Tester ASTM D4970/D4970M

Pilling Resistance: Pill Box Method

ISO 12945-1: 2000, CAN/CGSB-4.2 No.51.1-95

Brush Pilling ASTM D3511

Pilling After Repeated Home Laundering: Appearance of Pill and Fuzz

Snagging: ABC Tester ASTM D3939/D3939M

Snagging: SnagPod Tester BS 8479

Snag Resistance: Penney's Snag Tester VF Workwear Work Instruction: WW-300



STRETCH TESTING

Measurement of fabric stretch and growth after a specified extension or load is applied and held for a specified time.

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Stretch Properties of Textile Fabrics: CRE Method ASTM D6614

Stretch Properties of Knitted Fabrics Having Low Power: Elastic Recovery ASTM D2594

Stretch Properties: Tension and Elongation of Elastic Fabrics ASTM D4964

Stretch Properties of Fabrics Woven from Stretch Yarns ASTM D3107



TENSILE, BURST, TEAR, & SEAM STRENGTH TESTING

Determines the force needed to rupture, break, elongate, or tear a fabric.

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Burst Strength

ASTM D6797, ASTM D3786/D3786M, CAN/CGSB-4.2 No. 11.1-94 2013

Break Strength & Elongation

ASTM D5034*, ISO 13934-4-2014, CAN/CGSB-4.2 No. 9.2-M90, ASTM D751 Sect 12-15; Procedure A, ASTM D5035, ISO 13934-1:2013, WSP 110.4 2009, ASTM D4632, ASTM D6775, Federal Test 191A Method 4108, PIA-Test Method-6016, ASTM D4830-ASTM D5035

Tear Strength

CAN/CGSB-4.2 No. 12.1-M90, ASTM D2261, ASTM D1424, ASTM D5735, WSP 100.3 2009, ASTM D5587*, ASTM D4533, STM D5733*, WSP 100.2 2009, ASTM D4830-ASTM D5733

Seam Break and Slippage

ASTM D1683, ASTM D434, ISO 13936-1, ASTM D4034

Pocket Reinforcement

ASTM D7506/D7506M

Performance of Bonded, Fused, and Laminated Apparel Fabrics ASTM D2724, AATCC 136



OTHER DURABILITY TESTING

Shane Lynch | 828-327-7000 ext. 4146 | slynch@manufacturingsolutionscenter.org

Applied Decorations 16 CFR 1500.51-52

Snap Testing

Determines holding strength of a prong-ring to the socket or stud of a snap fastener. ASTM D7142



FLAMMABILITY TESTING

Shane Lynch | 828-327-7000 ext. 4146 | slynch@manufacturingsolutionscenter.org

Flammability of Wearing Apparel** 16 CFR 1610/ASTM D1230

Flammability Apparel Exemption** 16 CFR 1610/ASTM D3776/AATCC 20 & 20A

Flame Resistance: 45° Angle Test CAN/CGSB-4.2 No. 27.5-2008

Vertical Flammability Federal Test 191A Method 5903, ASTM D6413-07 (2011), ASTM F1358-00 (2005)

Fire Tests for Flame Propagation of Textiles and Films NFPA 701 TM1

California Technical Bulletin 117-2013 CA TB117-2013

Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture Cover Fabric Test NFPA 260-2013

UFAC: Fabric Classification



FORMALDEHYDE, PHENOLS, PH AND ALKALI TESTING

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Formaldehyde Detection in Fabrics

JIS 112 L 1041, MSC-105 (Spot Test Method), AATCC 112 (Jar Method), AATCC 206, ISO 14184-1 Part 1&2

pH Level of Textiles AATCC 81

pH of Aqueous Extract BS EN ISO 3071:2006

Phenolic Yellowing Assesses the propensity to phenolic yellowing of textile materials. ISO 105-X18

Phenol Levels MSC Phenol Level Method (Textiles), EPA Method 420.1-Modified (Plastics)

Alkalinity of Textiles AATCC 144



METAL/LEAD TESTING

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Metal/Lead Screening using XRF Gun ASTM F2853-10



MOISTURE MANAGEMENT TESTING

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Absorbency

Determine the absorbency of textiles after 1 home laundering. AATCC/ASTM TS-018, AATCC 79

Absorption of Nonwovens

Determines the liquid absorption capacity of nonwovens. ISO 9073-6 Part 6 Sections 5 & 6

Drying Rate: To be performed after 1 home laundering.

HTC Scale Method, AATCC 201, AATCC 200

Drying Rate of Fabrics: Heated Plate Method

AATCC 201

Drying Rate of Textiles at Absorbent Capacity: Air Flow Method AATCC 200

Liquid Moisture Management Properties of Textile Fabrics: MMT Method

Measures liquid moisture management properties of a textile based on water resistance, water repellency, and water absorption characteristics of the fabric structure. AATCC 195

Vertical Wicking

Evaluate ability of a vertically aligned fabric to transport liquid. AATCC 197, TPACC Method, AATCC/ASTM TS-017

Horizontal Wicking

Evaluate ability of a horizontally aligned fabric to transport liquid. AATCC 198

Water Repellency: Spray Test

Measure the resistance of fabrics, with or without a water-repellent finish, to wetting by water. AATCC 22, ISO 4920:2012

Water Resistance: Impact Penetration Test*

Measure the resistance of fabrics to the penetration of water by impact. AATCC 42

Surface Water Absorption of Terry Fabrics

Determine the ability of a terry fabric to absorb and retain water. ASTM D4772

Aqueous Liquid Repellency

Determine the effectiveness of a protective finish by evaluating a fabric's resistance to wetting of water/alcohol solutions. AATCC 193

Moisture Vapor Transmission

Determines the rate of water vapor transmission of textiles. ASTM E96, AATCC 204

Water Resistance: Hydrostatic Pressure Test

Measures the resistance of a fabric to the penetration of water under hydrostatic pressure. AATCC 127*, AATCC 208



PHYSICAL TESTING

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Oil Repellency: Hydrocarbon Resistance Test

Evaluate fabric's resistance to wetting of liquid hydrocarbons in order to detect the presence of a fluorochemical finish. AATCC 118, ISO 14419-2010

Soil Release: Oily

Evaluate the fabric's ability to release an oily soil after exposure to home laundering conditions. AATCC 130

Evaluating Stain Removal Performance in Home Laundering ASTM D4265

Float Loop Length and Pattern Yarn Strings in Socks

Appearance After Home Laundering: Color Change, Skew, Pill, Fuzz AATCC/ASTM TS-008

Appearance of Apparel and Other Textile End Products after Home Laundering

AATCC 143

Air Permeability of Textiles ASTM D737, BS 5636, WSP 70.1 2008, AS 2001.2.34-1990, ISO 9237-1995

Care Instruction Determination & Confirmation ASTM D3938

Fabric Weight of Fabrics ASTM D3776*, ISO 3801:1997 Method 5, WSP 130.1 2009

Unit Mass of Fabrics CAN/CGSB-4.2 No. 5.1-M90

Fabric Mass of Coated Fabrics ASTM D751 Section 10.2

Fabric Width ASTM D3774, CAN/CGSB-4.2 No. 4.1-2008

Dimensional Change/Stability of Textiles (Shrinkage) AATCC 135, AATCC 150, ISO 5077:2007, CAN/CGSB-4.2 No. 58-2019, AATCC 158

Linear Dimensional Change ASTM D1204

Fit Properties of Socks HIFOMACO LCS 4800, NAHM forms

Fit Properties of Sheers and Tights THA Volumetric Forms, HIFOMACO HT-36L

Relaxed Layout of Socks/Hosiery

Smoothness Appearance of Fabrics After Repeated Home Laundering AATCC 124

Smoothness of Seams in Fabrics After Repeated Home Laundering AATCC 88B

Retention of Creases in Fabrics after Repeated Home Laundering AATCC 88C, ISO 7769-2009

Skewness Change in Fabric and Garment Twist AATCC 179

Stiffness of Fabrics ASTM D1388 – Option A

ASTIM D1388 – Option A

Fabric Thickness MSC Method



REPEATED LAUNDERING

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Repeated Home Laundering AATCC LP1, AATCC 135

Repeated Hand Laundering AATCC LP2

Domestic Washing and Drying Procedures for Textile Testing ISO 6330:2012

Repeated Industrial Laundering ISO 15797



FOAM TESTING

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Foam Density

ASTM D3574 Test A

Foam Indentation Force Deflection Test ASTM D3574 Test B1



WEATHER AND LIGHT STABILITY TESTING

Determine the effects of exposing materials to different types of sunlight and moisture.

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Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials (UVA) ASTM G154-06

Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials

ASTM G154-05a

Weather Resistance of Textiles: Xenon Lamp Exposure AATCC 169

Weather Resistance: UV Light and Moisture Exposure AATCC 186

Colorfastness to Light: Xenon-Arc AATCC 16.3

Colorfastness to Light: Outdoor AATCC 16.1

Xenon-Arc Exposure Plastics Outdoors ASTM D2565-99/08

Geotextile Deterioration – Light, Moisture & Heat using Xenon Arc ASTM D4355-07

Weatherability of Automotive Parts JIS D 0205

Rubber Deterioration ASTM D750-12, ASTM D1148-07a

Accelerated Weathering Test Conditions and procedures for Bituminous Materials – Cycle A ASTM D4798-04

Accelerated Exposure of Automotive Interior Trim Components – Flat Array Xenon Arc Apparatus SAE J2412-04



FIBER ANALYSIS, IDENTIFICATION, AND CONSTRUCTION

Includes a number of standard test methods that analyze fiber content and construction of yarn, fabric, socks, and other textiles. See price list for more details.

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Fiber Content

AATCC 20 & 20A (Yarn, Fabric, Sock, or Pantyhose in %), ASTM D629, CAN/CGSB-4.2 NO. 14-2005

Specialty Fiber Microscopy/Cross Section AATCC 20

Fiber Content/Yarn Count/Construction for an Entire Sock ASTM D1059 & D2260

Yarn Count/Denier Count of Yarn in Fabric ASTM D1059 & D2260

Filament Count per Yarn Identified ASTM D1059 & D2260

Yarn Number by Skein Method ASTM D1907/D1907M

Breaking Strength of Yarn by Skein Method ASTM D1578

Twist in Yarns

Determine amount and direction of twist by direct counting or untwist/re-twist method. ASTM D1423

Extractable Matter in Textiles: Oil Pick Up % MSC-107

Shrinkage of Yarns – in Boiling Water and Dry Heat ASTM D2259

Staple Length of Fibers ASTM D519

Coefficient of Friction – Yarn to Solid Material ASTM D3108

Yarn Spinning Type Determine the spinning type used in creating the yarn (OE, Ringspun, Air Jet, etc.). ASTM D3888

Melting Point

Identify a fiber by determining the melting point of that particular fiber. ASTM D276

Thread Count Analyze picks per inch of a woven fabric. ASTM D3775, CAN/CGSB-4.2 NO. 6-2013

Knitted Fabric Count Wale and course count of knit fabrics. ASTM D8007, CAN/CGSB-4.2 NO. 7-M88

Needle Count of a Sock MSC-102

Course Count of a Sock MSC-106

Deconstructing fabric into varn form (Hourly) Deconstructed so that yarn testing can be performed.

Defect Analysis/Examination (Hourly)



ANTIMICROBIAL TESTING

Evaluating the degree of antibacterial activity through a variety of standard test methods.

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Antibacterial Finishes AATCC 100*

Antibacterial Parallel Streak AATCC 147*

Repeated Home Laundering AATCC 150 *Accredited ISO/IEC 17025, **Accredited CPSIA/ISO/IEC 17025

Antimicrobial Activity

ASTM E2149*

Antibacterial Activity and Efficacy on Textile Products JIS L 1902:2008, ISO 20743:2013

Determining the Activity of Incorporated Antimicrobial Agents in Polymeric of Hydrophobic Materials ASTM E2180

Antibacterial Activity Assessment of Textile Materials: Agar Plate Method AATCC 90

Antibacterial Activity Assessment of New Carpets AATCC 174 Parts I and II

Quantitative Evaluation of the Antibacterial Properties of Porous Antibacterial Treated Articles ASTM E3160



STRUCTURAL FURNITURE TESTING

The Manufacturing Solutions Center Structural Department performs custom tests that help determine the most effective tests for construction details and overall product performance in addition to many established BIFMA tests and standards to test the structural strength and durability of the frame of a piece of furniture.

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Customized Furniture and Structural Testing

The equipment and expertise at the Manufacturing Solutions Center gives us the capability to perform customized furniture and structural testing for the development and analysis of furniture and other products. Our philosophy of being an "open" lab means you can work directly with our staff to create tests that meet your current requirements.

BIFMA X5.1-2017 General Purpose Office Chairs Tests

Used to provide safety and performance requirements for chairs that are primary designed for use in an office environment.

Section 5: Backrest Strength Test – Static, Type I & II

Section 6: Backrest Strength Test – Static, Type III

Section 7: Drop Test – Dynamic

Section 8: Swivel Test – Cyclic

Section 9: Tilt Mechanism Test – Cyclic

Section 10: Seating Durability – Cyclic

Section 11: Front or Rear Stability Part A – Rear Stability, Part B – Front Stability

Section 12: Arm Strength Test – Static, Vertical

Section 13: Arm Strength Test – Static, Horizontal

Section 14: Backrest Durability Test – Cyclic, Type I Section 15: Backrest Durability Test – Cyclic, Type II & III Section 16: Caster/Chair Base Durability Test – Cyclic Section 17: Leg Strength Test Section 18: Footrest Static Load Test – Vertical Section 19: Footrest Durability Test – Cyclic, Vertical Section 20: Arm Durability Test – Cyclic Section 21: Chairs with Manually Adjustable Seat Out-Stop Test for Chairs with Manually Adjustable Seat Depth Section 22: Tablet Arm Chair Static Load Test Section 23: Load Ease Test – Cyclic

Section 24: Structural Durability Test – Cyclic

BIFMA X5.3-2007 Vertical Files Tests

Tests to evaluate the safety, durability, and structural performance of vertical files.

Section 4: Stability Test Section 5: Unit Strength Test Section 6: Racking Resistance Test Section 7: Drop Test Section 8: Extendible Element Cycle Test Section 9: Interlock Test Section 10: Rebound Test Section 11: Out-Stop Test Section 12: Lock Tests 12.1 - Force Test for Locks 12.2 - Locking Mechanism Cycle Test Section 13: Latch Test – Static

Section 14: Compressor Test

Section 15: Pull Force Test



BIFMA X5.4-2020 Public/Lounge Seating Tests

Evaluates the safety, durability, and structural adequacy of lounge and public seating.

Section 5: Backrest Strength Test – Static, Horizontal Section 6: Backrest Strength Test – Static, Vertical Section 7: Backrest Durability – Cyclic, Horizontal Section 8: Backrest Durability – Cyclic, Vertical Section 9: Arm Strength Test – Static, Horizontal Section 10: Arm Strength Test – Static, Vertical Section 11: Arm Durability Test for Multiple Seating Units – Cyclic, Horizontal

Section 12: Arm Durability Test for Multiple Seating Units – Cyclic, Vertical

Section 13: Arm Durability Test for Single Seat Units – Cyclic, Angular

Section 14: Seat Durability Test – Cyclic

Section 15: Drop Test – Dynamic

Section 16: Leg Strength Test Front & Side Application

Section 17: Unit Drop Test – Dynamic

Section 18: Caster/Unit Base Durability – Cyclic

Section 19: Swivel Test – Cyclic

Section 20: Tilt Mechanism – Cyclic

Section 21: Stability Tests

Section 22: Tablet Arm Load Ease – Cyclic

Section 23: Tablet Arm Load – Static

Section 24: Structural Durability Test

Section 26: Leg Rest Strength Test – Static

Section 27: Footrest Load Test – Static, Vertical

Section 28: Footrest Durability Test – Cyclic, Vertical

BIFMA X5.5-2014 Desks/Tables Tests

Evaluates the safety, durability, and structural performance of desk and table products.

Section 4: Stability Tests – Static

- 4.2 Stability with Extendable Elements Open
- 4.3 Stability under Vertical Load
- 4.4 Horizontal Stability Test for Desks/Tables with Casters
- 4.5 Force Stability Test for Tall Desk/Table Products

Section 5: Unit Strength Tests – Static

- 5.2 Concentrated Load Tests for Primary Surfaces
- 5.3 Distributed Functional Load Test
- 5.4 Concentrated Proof Load Test
- 5.5 Distributed Proof Load Test
- 5.6 Transaction Surface Torsion Load Test
- 5.7 Extendable Element Static Load Test

Section 6: Top Load Ease Cycle Test – Cyclic

Section 7: Desk/Table Unit Drop Test – Static

Section 8: Leg Strength Test – Static

Section 9: Disengagement Test for Tall Desk/Table Products – Static

Section 10: Extendible Element Cycle Test – Cyclic

- 10.2 Cycle Test for Extendable Elements Deeper than Wide
- 10.3 Cycle Test for Extendable Elements Wider than Deep
- 10.4 Cycle Test for Center/Pencil Drawers

Section 11: Extendable Element Retention Impact and Durability Test

Section 12: Extendable Element Rebound Test – Static

Section 13: Interlock Strength Test – Static

Section 14: Lock Tests – Static

14.2 - Force Test for Extendable Element Locks

14.3 - Force Test for Door Locks

14.4 - Locking Mechanism Cycle Test

Section 15: Work Surface Vertical Adjustment Tests – Static

Section 16: Keyboard Support and Input Device Support Adjustment Tests – Static

Section 17: Door Tests

- 17.2 Strength Test Vertically Hinged, Bi-fold, and Vertically Receding Doors Static
- 17.3 Hinge Override Test for Vertically Hinged Doors Static

17.4 - Vertically Receding Doors Strength Test – Static

17.5 - Horizontal Receding Doors Strength Test – Static

17.6 - Wear and Fatigue Test for Hinged, Horizontal Sliding, and Tambour Doors – Cyclic

17.7 - Wear and Fatigue Test for Vertical Receding Doors – Cyclic

17.8 - Wear and Fatigue Test for Horizontal Receding Doors – Cyclic

17.9 - Vertical and Horizontal Receding Door Out-Stop Test - Impact and Durability – Cyclic

17.10 - Slam Closed Test for Vertically Hinged and Vertically Receding Doors – Static

17.11 - Drop Cycle Test for Horizontally Hinged and Horizontally Receding Doors – Cyclic

17.12 - Slam Test for Doors that Free Fall Open or Closed – Static

17.13 - Slam Open and Closed Test for Doors That Do Not Free Fall – Static

17.14 - Door Latch Test – Static

Section 18: Durability Test for Desks and Tables with Casters – Cyclic

Section 19: Pull Force Test – Static

BIFMA X5.9-2012 Storage Units Tests

Evaluates the safety, durability, and structural performance of storage units.

Section 4: Unit Strength Test

Section 5: Leg/Glide Assembly Strength Test

Section 6: Racking Resistance Test

Section 7: Vertical Load Durability Tests

- 7.1 Top Load Ease Cycle Test
- 7.2 Drop Test for Units with Seat Surfaces Dynamic
- 7.3 Durability Test for Units with Seating Surfaces Cyclic Impact

Section 8: Separation and Disengagement Tests

8.1 - Separation Test for Tall Storage Units w/ Vertically Attached or Stackable Components

- 8.2 Upward Impact Force Disengagement Test for Storage Units
- 8.3 Upward Force Static Disengagement Test for Storage Units

Section 9: Stability Tests

- 9.1 Purpose of Tests
- 9.2 Horizontal Force Stability Test for Tall Storage Units

- 9.3 Stability Test for Type I Units with at least one Extendible Element
- 9.4 Stability Test for Type I Storage Units with Multiple Extendible Elements
- 9.5 Stability Test for Type II Storage Units having Extendible Elements
- 9.6 Vertical Force Stability Test for Storage Units
- 9.7 Stability Test for Pedestals/Storage Units with Seat Surfaces

Section 10: Storage Unit Drop Test

Section 11: Movement Durability Test for Mobile Storage Units

Section 12: Rebound Test

Section 13: Extendible Element Retention Impact and Durability (Out Stop) Tests

Section 14: Lock Tests

- 14.2 Force Test for Extendible Element Locks
- 14.3 Force Test for Door Locks
- 14.4 Locking Mechanism Cycle Test

Section 15: Extendible Element Cycle Tests

- 15.2 Cycle Tests for Extendible Elements Deeper than Wide that Do Not Swivel
- 15.3 Cycle Tests for Extendible Elements Wider than Deep that Do Not Swivel
- 15.4 Horizontal Cycle Test for Television/Video Display Terminal Extendible Elements
- 15.5 Cycle Test for Low Height Drawers

Section 16: Interlock Strength Test

Section 17: Door Tests

- 17.2 Strength Test for Vertically Hinged, Bi-fold, and Vertically Receding Doors
- 17.3 Hinge Override Test for Vertically Hinged Doors
- 17.4 Vertical Receding Doors Strength Test
- 17.5 Horizontal Receding Doors Strength Test
- 17.6 Wear and Fatigue Tests for Hinged, Horizontally Sliding, and Tambour Doors
- 17.7 Wear and Fatigue Test for Vertical Receding Door
- 17.8 Wear and Fatigue Test for Horizontal Receding Door
- 17.9 Vertical and Horizontal Receding Door Out Stop Test Cyclic Impact & Durability
- 17.10 Slam Closed Test for Vertically Hinged and Vertically Receding Doors
- 17.11 Drop Test for Horizontally Hinged and Horizontally Receding Doors Cyclic
- 17.12 Slam Test for Doors which Free Fall Open or Closed
- 17.13 Slam Open and Closed Test for Doors which Do Not Free Fall
- 17.14 Door Latch Test

Section 18: Clothes Rail Static Loading Test

Section 19: Swivel Cycle Test for Television/Video Display Terminal Surfaces

Section 20: Pull Force Test

Others:

ANSI/BIFMA X5.6 – 2010: Panel Systems

ANSI/BIFMA X5.11 – 2015: General Purpose Large Occupant Office Chairs

ANSI/SOHO S6.5 – 2008: Small/Home Office Furniture

FNAE 80 - 214A: Recliner Cycle Test

TRAINING

Textile training classes can be customized to meet the needs and interests of individual clients. Classes can be conducted at the client's facility or at the Textile Center. Customized training classes often allow for a more in-depth focus in a given area, serving to reinforce the client's business or product line. Please contact MSC or TTC for additional Information.

Manufacturing Solutions Center

Hosiery 101/102 and Legwear Development

Covers the basics of hosiery knitting, dyeing, finishing, and testing the quality of the manufacturing process. This course is intended for all types of people involved with the Hosiery Industry: buyers, retailers, suppliers, schedulers, supervisors, quality control, personnel, designers, and new employees. Legwear Development covers Hosiery 101/102 information with support for entrepreneurs as they build their business in the hosiery industry.

Rick Small | 336-963-2832 | rsmall@manufacturingsolutionscenter.org

M1 Stoll Plus Training

Flatbed knitting and M1 Plus programming training taught by flat knitting professionals with a mixture of both theoretical and real world applications.

Alex Cranston | 828-327-7000 ext. 4101 | acranston@manufacturingsolutionscenter.org

Software Training

The Manufacturing Solutions Center offers training on AutoCAD and Solidworks software.

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Textile Technology Center

Textile 101

Natural Fibers, Synthetic Fibers, Staple Fiber Processing, Staple Spinning Systems, Yarn Numbering Systems, Fabric Constructions, Dyeing & Finishing, Product Testing, Emerging Trends & Technologies.

Jasmine Cox | 704-825-6302 | cox.jasmine@gaston.edu

MSC & TTC Industrial Training: For most industrial training needs, we partner with the Workforce Development Innovation Center at Catawba Valley Community College & Economic and Workforce Development at Gaston College.

WEB SERVICES

The Manufacturing Solutions Center offers website design, packaging design, brochures and posters, catalogs, and logo design.

Bai Lor | 828-327-7000 x4485 | blor@manufacturingsolutionscenter.org

Basic Website – up to 7 pgs Starter Website – up to 15 pgs Lite Website – up to 20 pgs

Includes:

- Website & logo design (if needed)
- Keyword optimization
- Product (socks and small products) photo shoot and background cleanup of pictures
- Minor future editing

Standard Website – up to 30 pgs Advanced Website – up to 40 pgs

- Run updates on WordPress and plugins
- Ecommerce/online store/SSL certificate
- Social media Google Business page, LinkedIn, and Facebook
- Additional work and custom coding for a fee



www.MTINUSA.com