



NGA Glazier Curriculum: 432.2 Hours

## **INTRODUCTION TO THE GLASS & GLAZING TRADE**

**68.85 Hours**

### **History of Glass**

Format: Online course on MyGlassClass.com

Hours: 0.1

Learning objectives: This video explains the history of glass, from its Stone Age beginnings circa 3,000 B.C to present-day float and tempered glass.

### **Introduction to Glazing Practices**

Format: Online course on MyGlassClass.com

Hours: 1

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Define terms associated with glazing
- ✓ Identify types of commonly used glass and their applications
- ✓ List common tasks performed by glaziers
- ✓ Explain common safety precautions for the glazing industry
- ✓ Identify common tools used in the glazing industry
- ✓ Describe the different methods of installing glass
- ✓ Describe best practices for measuring a rough opening
- ✓ Describe the difference between screw spline and shear block fabrication

### **Glazing Math Essentials**

Format: Online course on MyGlassClass.com

Hours: 2

Learning objectives: Upon completion of this course, learners will be able to measure materials and openings for glass design and fabrication projects using rulers and tape measures, calculate exact measurements with fractions and decimals, and measure angles using a combination square and a protractor.

### **Interpreting Common Documents**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, you will be able to identify documents commonly used in the glass and glazing industry, list the basic purpose of each of these documents, and explain the importance of each document.

### **PPE for Working with Flat Glass**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, learners will be able to comply with ASTM and OSHA standards for donning, wearing, removing, and maintaining personal protective equipment specific to employees in the glass industry.

Founded in 1948, the National Glass Association (NGA) combined with the Glass Association of North America (GANA) on February 1, 2018 to form the largest trade association serving the architectural glass and metals industry supply chain, including glazing contractors, full-service glass companies, glass fabricators, primary glass manufacturers and suppliers to the industry.

### **Safe Glass Handling 101**

Format: Online course on MyGlassClass.com

Hours: 0.75

Learning objectives: Upon completion of this course, learners will be able to demonstrate safe glass handling when manually lifting, carrying and transferring glass to help ensure their safety as well as the safety of those around them.

### **Best Practices for Removing Broken Glass**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ List safety precautions to take when removing broken glass from a window frame
- ✓ Explain how to handle broken glass
- ✓ Describe best practices for removing single-pane glass
- ✓ Detail special considerations for removing broken glass

### **OSHA 30**

Format: Online course on MyGlassClass.com

Hours: 30

Learning objectives: The OSHA 30 Hour Construction Industry training course include a cross section of essential topics from OSHA Standards for Construction, 29 CFR 1926. This course is provided by the Underwriters' Laboratory (UL), an OSHA-authorized online training provider, via MyGlassClass.com. OSHA card provided by the U.S. Department of Labor upon completion.

### **Employee Safety Guide**

Format: Book

Hours: 33.5

Learning objectives: This reference guide helps employees learn to protect themselves and your company. Information includes forklift and scaffold safety, OSHA regulations, and how to protect yourself and others from blood borne pathogens.

Students will be quizzed on their knowledge of the manual online at MyGlassClass.com.

## **JOBSITE TOOLS AND EQUIPMENT**

**65.25 Hours**

### **Hand and Power Tool Safety for Construction**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: This UL course covers the injuries and hazards associated with hand and power tools, as well as precautions for using them.

### **Basic Rigging Awareness**

Format: Online course on MyGlassClass.com

Hours: 1.5

Learning objectives: This UL course covers proper equipment to use when rigging a load, inspection and storage requirements for equipment, general safety rules for rigging, steps required to plan a rigging job, and how to plan and prepare a safe rigging job.

### **Aerial Lifts and Scissor Lifts**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: This UL course covers the common hazards associated with aerial lifts; ways to prevent these common hazards; and safe pre-operation, operation and maintenance practices for this type of equipment.

### **Fall Protection**

Format: Online course on MyGlassClass.com

Hours: 0.75

Learning objectives: This UL course covers types of fall protection and when they are required, what employers must do to protect employees from fall hazards at work, and what kinds of fall protection can be used for different job tasks.

### **Scaffold Safety Awareness**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: This UL course covers common scaffold hazards, the basic principles of scaffold safety, scaffold design and wire rope shielding, inspection responsibilities, and basic fall protection safety guidelines.

### **Powered Industrial Trucks**

Format: Online course on MyGlassClass.com

Hours: 1.5

Learning objectives: This three-part UL course covers the current OSHA regulations related to pre-operation procedures, pre-operation inspection and maintenance, stability and handling loads.

### **GANA Glazing Manual, Part I (Chapters 1, 2, 4, 5, and 8)**

Format: Manual

Hours: 60

Learning objectives: Upon completion of the chapters referenced above, students will be familiar with:

- ✓ The specific properties and characteristics of heat-strengthened, chemically strengthened, coated, spandrel, laminated, insulating, bent and decorative glass, as well as mirrors.
- ✓ How to read labels on glass products
- ✓ The codes associated with safety glazing in hazardous locations
- ✓ The differences between fire-rated and fire-resistive glass products

Students will be quizzed on their knowledge of the manual online at MyGlassClass.com.

## **GLASS FABRICATION**

**26.1 Hours**

### **The Float Glass Manufacturing Process**

Format: Online course on MyGlassClass.com

Hours: 0.1

Learning objectives: This video explains how float glass is made, introducing viewers to the raw materials used to create float glass and the various stages of the float glass manufacturing process.

### **Basics of Insulating Glass Units**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Define the term “Insulating Glass Unit”
- ✓ Identify and describe the various parts of an IGU
- ✓ Explain the function of an IG unit
- ✓ Identify common IGU applications
- ✓ Identify common reasons for IGU replacement

### **Glass Fabrication Tools & Techniques**

Format: Online course on MyGlassClass.com

Hours: 1

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Define glass shop fabrication
- ✓ Identify common tasks performed by glaziers that require the use of glass fabrication power tools
- ✓ Summarize OSHA’s crystalline silica rule
- ✓ Explain safety precautions to take when using glass fabrication tools
- ✓ Identify common glass fabrication power tools
- ✓ Measure and mark glass for cutting and drilling with power tools
- ✓ Describe common glass cuts made with power tools
- ✓ Describe the steps for cutting, drilling and edging glass using power tools
- ✓ Describe proper glass disposal

### **How to Cut Glass: Best Practices**

Format: Online course on MyGlassClass.com

Hours: 1

Learning objectives: Upon completion of this course, students will be able to describe best practices for manually making and breaking straight cuts on glass and mirror.

### **Shower Enclosure Design & Installation**

Format: Online course on MyGlassClass.com

Hours: 1

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Identify various types of shower enclosures
- ✓ Describe some of the basic concerns when designing a frameless shower enclosure
- ✓ Describe how to safely install a frameless shower enclosure, including how to properly measure
- ✓ Explain ways to speed up installation and address common installation challenges

### **Custom Mirror Design & Installation**

Format: Online course on MyGlassClass.com

Hours: 1.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Discuss best practices for assessing wall conditions, and measuring for fabrication and installation
- ✓ Discuss best practices for installing a custom mirror
- ✓ Identify the tools and processes for custom mirror design and installation
- ✓ Design a custom mirror, including detailed sketches and hardware selection
- ✓ Explain the steps for installing a custom mirror

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## Guide to Architectural Glass

Format: Manual

Hours: 20

Learning objectives: Upon completion of this manual, students will be able to:

- ✓ Explain the float glass manufacturing process
- ✓ Identify types of commonly used glass
- ✓ Describe the physical properties of glass
- ✓ Identify the thermal and solar properties of float glass

Students will be quizzed on their knowledge of the manual online at MyGlassClass.com.

## METAL FABRICATION & SEALANTS

47.5 Hours

### Basics of Architectural Aluminum

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Identify how architectural aluminum is used in the glass and glazing industry
- ✓ Explain aluminum's unique physical properties
- ✓ Identify common finishes
- ✓ Describe the characteristics of a paint finish
- ✓ Describe the characteristics of an anodized finish
- ✓ Explain the characteristics of powder coat

### Metal Tools of the Trade

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, learners will be able to identify common metal fabrication tools used to cut and drill architectural aluminum, and their appropriate uses.

### Metal Fabrication Tools & Techniques

Format: Online course on MyGlassClass.com

Hours: 1

Learning objectives: Upon completion of this course, learners will be able to:

- ✓ Describe the ways in which architectural metals are used in construction
- ✓ Identify appropriate PPE and safety precautions when fabricating metal
- ✓ Identify precautions when working with anodized aluminum
- ✓ Identify the common tasks performed in metal fabrication
- ✓ Describe tools used to cut metal
- ✓ Describe best practices for cutting metal
- ✓ Describe best practices for drilling holes in metal

### Basics of Sealants

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, learners will be able to:

- ✓ Describe the purpose of sealants
- ✓ Identify common types of sealants and their characteristics
- ✓ Describe how sealants cure and the forces that act on them
- ✓ Identify types of sealant failure
- ✓ Explain how to select the correct sealant

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## Sealants Manual

Format: Manual

Hours: 45

Learning objectives: Upon completion of this manual, students will be able to:

- ✓ Identify common sealants and sealant joint types
- ✓ Describe the purpose, challenges, and installation considerations related to sealant use in building envelope systems
- ✓ Describe common substrates and materials that sealants come in contact with during their service life, as well as compatibility/incompatibility issues
- ✓ Describe good sealant application practices
- ✓ Explain how to remove and re-apply sealant in remediation work
- ✓ Identify protective glazing applications for sealants

## SYSTEMS & CODES

91.5 Hours

### Glass & Metals 101

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: This course provides an introductory guide to basic product definitions, as well as frequently asked questions regarding glass & glazing performance values, load requirements, and codes & standards.

### Basics of Storefront & Entrances

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Define storefront and entrance
- ✓ Identify and define the various parts of a storefront system
- ✓ Identify the different types of storefront systems
- ✓ Identify and define the various parts of an entrance system
- ✓ Identify the different types of entrance systems
- ✓ Explain what you will do as a glazier when working with storefronts and entrances

### Storefront Metal Fabrication Techniques

Format: Online course on MyGlassClass.com

Hours: 0.75

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Identify the functional components of a storefront assembly
- ✓ Describe the fabrication process for the storefront components
- ✓ Fabricate shear blocks for mounting horizontal members to vertical mullions
- ✓ Fabricate water dam for sill can
- ✓ Explain the use of prefabricated entrance components

### **Storefront Installation**

Format: Online course on MyGlassClass.com

Hours: 1.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Install storefront in accordance with the production drawings
- ✓ Describe worksite safety requirements
- ✓ Attach the sill to the building structure
- ✓ Attach the head to the building structure
- ✓ Place vertical mullions
- ✓ Attach horizontal members
- ✓ Install water dams
- ✓ Assemble snap-in components to the storefront frame
- ✓ Install IGUs and filler panels
- ✓ Install weatherproofing
- ✓ Conduct water test

### **Commercial Entrance Installation**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Identify the proper tools and techniques necessary to install a commercial entrance in accordance with the production drawings and manufacturer instructions
- ✓ Describe jobsite safety requirements
- ✓ Install a fabricated commercial entrance frame
- ✓ Attach a door to the entrance frame
- ✓ Install sidelites into the entrance frame

### **Basics of Curtainwall**

Format: Online course on MyGlassClass.com

Hours: 0.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Define curtain wall
- ✓ Identify the types of curtain wall
- ✓ Identify common terms and components of a curtain wall
- ✓ Identify the two types of glazing methods used to install glass in stick curtain wall
- ✓ Identify the two types of waterproofing methods used in curtain wall
- ✓ Explain what you will do as a glazier when working with curtain wall

### **Curtainwall Fabrication Techniques: Stick Systems**

Format: Online course on MyGlassClass.com

Hours: 0.75

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Identify the proper tools and techniques required to fabricate parts according to cut list
- ✓ Identify the functional components of a curtain wall assembly
- ✓ Describe the fabrication process for the curtain wall components
- ✓ Fabricate shear blocks for mounting horizontal members to vertical mullions
- ✓ Explain the use of prefabricated entrance components

### **Curtainwall Installation: Stick Systems**

Format: Online course on MyGlassClass.com

Hours: 1.5

Learning objectives: Upon completion of this course, students will be able to:

- ✓ Describe worksite safety requirements
- ✓ Install curtain wall anchors
- ✓ Install verticals
- ✓ Attach horizontals
- ✓ Attach weather-stripping
- ✓ Set glass
- ✓ Attach pressure bars
- ✓ Attach face cap
- ✓ Conduct a water test

### **GANA Glazing Manual, Part II (Chapters 9, 10)**

Format: Manual

Hours: 25

Learning objectives: Upon completion of the chapters referenced above, students will be familiar with:

- ✓ General guidelines for glazing system design
- ✓ Specific guidelines for confirming material compatibility and setting glass
- ✓ Wet and dry glazing systems
- ✓ Pressure glazed systems
- ✓ Butt joint glazing
- ✓ Structural silicone glazing
- ✓ Acrylic foam tape structural glazing
- ✓ Sloped glazing
- ✓ Special considerations related to bent glass
- ✓ General guidelines for interior glazing
- ✓ Common types of doors, entrances and related hardware
- ✓ Special glass applications (point-supported systems, walkways, glass railings)

Students will be quizzed on their knowledge of the manual online at MyGlassClass.com.

### **Guide to the Glass and Glazing Requirements of the Model Building Codes**

Format: Manual

Hours: 60

Learning objectives: This guide will assist glaziers and glass installers in complying with all appropriate glazing requirements of the Model Building Codes. Includes chapters on Building Codes, Safety Glazing, Fire-Rated Glazing, Structural Requirements, Energy Conservation Codes, Green Construction, Accessibility, Repair and Alteration Work, and Compliance and Responsibility.

Students will be quizzed on their knowledge of the manual online at MyGlassClass.com.



**Reading Plans and Blueprints**

Format: Online course on MyGlassClass.com

Hours: 2

Learning objectives: Upon completion of this course, students will be able to read and interpret plans and blueprints in order to identify what is needed for construction.

**Intro to Estimating**

Format: Online course on MyGlassClass.com

Hours: 2

Learning objectives: Upon completion of this course, students will be able to interpret plans for the purpose of estimating projects.

**Glass & Glazing Estimating Essentials Manual**

Format: Manual

Hours: 130

Learning objectives: Used in conjunction with the MyGlassClass.com courses on How to Read Blueprints and Plans, and Intro to Estimating—this manual will help glaziers new to estimating to:

- ✓ Identify the various types of pages that appear on blueprints
- ✓ Understand and identify the meanings of various symbols
- ✓ Understand how to distinguish between floor plans, elevations, sections, details, window and door schedules
- ✓ Understand how to interpret dimensioning and scale
- ✓ Learn how to complete the forms required for doing takeoffs and estimating
- ✓ Learn how to do basic labor estimation using data from blueprints
- ✓ Understand how to submit a bid
- ✓ Understand basic contractor relationships

*\*Manual hours are calculated using estimated averages, including reading pace for both native English speakers and English as a second language speakers, estimated time to digest content and study for quizzes, page count, density of text and subject matter complexity.*