



# **Certified Auto Glass Technician Exam Handbook**

## **Certified Master Auto Glass Technician Exam Handbook**

# **NGA**

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National Glass Association

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## Preface

An auto glass technician installs and repairs safety glass and related materials (e.g., Lexan®) on automobiles, trucks and other vehicles and equipment. This handbook explains the process necessary to becoming certified. It also provides the exam specifications and sample exam questions for both the technician and master levels.

This handbook provides auto glass technicians and master auto glass technicians, who are candidates for NGA's Certification program, with a unique reference to use in preparation for taking the certification examination. The information contained in this handbook is based on voluntary industry standards for acceptable practice as reflected in the job analysis and exam specifications.

This handbook is merely the starting point for preparing to take the certification exam. You should combine using this handbook with on-the-job training (OJT) and on-the-job experience *as well as the many study sources available industry-wide* such as NGA's *Auto Glass Technician Reference Manual*. In a career that changes as much as the auto glass field, it is a challenge for technicians to remain current.

### Disclaimer for Training and Educational Programs

The National Glass Association (NGA) is a District of Columbia nonprofit corporation, which is tax exempt under Section 501(c)(6) of the Internal Revenue Code. NGA's training and educational programs have been developed in furtherance of its nonprofit tax exempt purposes primarily to benefit the architectural, automotive and specialty glass industries. These programs have been developed by NGA or its instructors to provide general education and training in connection with the above industries. These programs cannot however, anticipate all physical and factual situations, and cannot take the place of professional experience and judgment. NGA does not guarantee, warrant or endorse the methods, procedures and manner of work or services described or referred to in the educational and training materials, or any work or services performed by any individual person or any firm or shop; all warranties are expressly excluded. Neither NGA nor its officers, directors, members, employees, instructors or agents shall be liable for any loss, damage or claim with respect to any work or services performed, whether or not it is based on the training and education programs. All such liabilities, including special, indirect or consequential damages, are expressly disclaimed and excluded.

## Introduction

Every year, and sometimes several times throughout the year, vehicle manufacturers introduce new vehicles. These introductions bring new challenges to the auto glass professional in several ways:

- They give auto glass technicians new vehicles to test their installation/repair skills.
- They give auto glass technicians opportunities to work with customers to determine glass parts needed for their vehicles.
- They challenge auto glass companies to provide the support needed to complete auto glass replacement/repair jobs properly and professionally.



What is the auto glass technician's job?

Depending on the company, the technician can be everything from the salesperson to the mobile-unit dispatcher to the complaint department. Ultimately, the technician is the person on whom the customer depends to get the job done right.

The responsibility and liability for safe, professional auto glass installations and repairs rest squarely on the *technician's* shoulders.

The purpose of this handbook is to provide information on how to become certified for those technicians who wish to sit for the NGA Certified Auto Glass Technician or Certified Master Auto Glass Technician exam.

# How to Use This Handbook

## Overview

This Certified Auto Glass Technician Exam Handbook is a study resource for experienced auto glass technicians who wish to sit for either the NGA Certified Technician or Certified Master Technician Exam. The topics included on the exams reflect the voluntary industry standards for acceptable practice and relate directly to the tasks and body of knowledge listed in the job analysis and exam specifications.

Because this is a reference and not a training guide, the format of this handbook is arranged to show a list of topics necessary for a candidate to study prior taking the exam. The auto glass knowledge statements are listed for both the Technician and Master levels. The certification exam items are written to test this body of knowledge. The content areas and class codes (A1, B1, C1, and so forth) are included in this area as cross-references to the specific knowledge to be tested. This handbook explains the NGA certification process.

## Handbook Content

This Certified Auto Glass Technician Exam Handbook consists of these content areas:

- NGA's Certified Auto Glass Technician Program
- Certified Auto Glass Technician Overview Exam Specifications
- Certified Master Auto Glass Technician Exam Specifications and Study References

## Technician Preparation

Follow these hints for using this reference to help you prepare for your NGA certification exam:

- Obtain the suggested referenced material listed in this handbook.
- Reserve a study area and set it up for study in advance.
- Ensure that your study area is comfortable and conducive to learning, with such features as adequate lighting, heat or air conditioning, chair, table (writing surface), and a minimum of outside noise. (continued on page 4.)

- Review the Technician Exam Specifications and sample exam questions listed in this handbook.
- Read the reference material actively and carefully, taking notes or jotting down questions to enhance your understanding of the content.

### **Master Technician Preparation**

Follow these hints for using this reference to help you prepare for your NGA master certification exam:

- Obtain the suggested referenced material listed in this handbook.
- Reserve a study area and set it up for study in advance.
- Ensure that your study area is comfortable and conducive to learning, with such features as adequate lighting, heat or air conditioning, chair, table (writing surface), and a minimum of outside noise.
- Review the Master Exam Specifications and sample exam questions listed in this handbook.
- Read the reference material actively and carefully, taking notes or jotting down questions to enhance your understanding of the content.

## NGA's CERTIFIED AUTO GLASS TECHNICIAN PROGRAM

Providing technical information and education for the auto glass industry is a high priority for NGA. In fact, NGA's mission statement clearly supports this priority:

*NGA's Mission is to provide information and education, as well as promote quality workmanship, ethics, and safety in the architectural, automotive and window and door glass industries. NGA acts as a clearinghouse for industry information, a catalyst in education and training matters, and a powerful voice on behalf of our members.*

To meet this priority, NGA has developed the Certified Auto Glass Technician Program in addition to other technical, safety and managerial programs. NGA is committed to providing the glass industry with educational materials and training programs at all levels, from entry level to senior management.



### NGA provides these essential certification services:

- Certification program management including registering, collecting and maintaining certification records; issuing certification credentials; enforcing certification policies; and resolving program discrepancies and challenges.
- Liaison between certification candidates and the certification committees.

### Objectives of NGA's Certified Auto Glass Technician Program

There are nine objectives for NGA's Certified Auto Glass Technician Program:

- Provide a means for practicing auto glass technicians to gain recognition and verification of their knowledge in their industry.
- Provide potential employers of auto glass technicians an additional, improved means by which to evaluate candidates.
- Improve the credibility of practicing auto glass technicians by measuring a specific body of basic knowledge.

- Recognize employee efforts to improve individual knowledge and proficiency.
- Promote universal industry safety training to safeguard worker health and welfare, emphasizing the glass industry's commitment to maintaining a safe workplace.
- Provide a forum in which the merits of new procedures and techniques can be analyzed and communicated to industry professionals.
- Ensure the future competency of the industry's pool of trained technicians by providing for regularly scheduled certification re-validations.
- Encourage auto glass installation and certification awareness by consumers and licensing/credential boards of government entities.
- Protect the public by ensuring that certified individuals have the knowledge necessary to practice competently as auto glass technicians.

*Note: It should be clearly understood that the certification criteria required by this program have been developed to enhance professional standards within the industry and have no relationship, by design or inference, to local wage schedules, private compensation agreements, or reduction of any management prerogatives regarding promotion or pay.*

## **NGA's Auto Glass Certification Committees**

There are two NGA auto glass certification committees:

**Auto Glass Certification Council:** This council serves as the Appeals Board for the certification program, ruling on such issues as exceptions to established program procedures or challenges that have been unsatisfactorily resolved by the NGA staff. The council meets as the Appeals Board twice each year.

**Auto Glass Certification Committee:** This committee is composed of a representative group of auto glass industry content experts. Guided by NGA's exam development professionals, their input assists NGA in assessing and developing certification examination specifications and job analyses. The committee meets throughout the year to update and revise the certification examinations.

## **Development of the Certified Auto Glass Technician and Master Examinations**

NGA's certification examinations are developed with the guidance of professional exam developers and administrators. These professionals score the examinations as well. They specialize in developing computer-based examinations for both professional and academic settings.

All NGA certification examinations meet testing-industry standards for fairness, validity and reliability:

- An examination is fair when its contents neither favor nor discriminate against any individual or group due to ethnic background, geographic locale, practice setting or other demographic criteria.
- An examination is valid when it accurately reflects the knowledge required for competent practice.
- An examination is reliable when it yields consistent results over time.

The validity of NGA's Certified Auto Glass Technician and Master examinations has been documented using two independent methods:

- First, the job analyses used to develop each examination were validated by a random sample of auto glass industry practitioners across the United States.
- Second, all examination items were validated by the NGA Auto Glass Certification Committee using well-accepted psychometric rating scales.

## **Questions and Answers about NGA's Certified Auto Glass Technician Program**

### ***What does it mean to be NGA certified?***

Passing a NGA certification examination means that you have met agreed-upon industry standards for basic knowledge in the field of auto glass replacement at the level you passed. You will receive a certificate, an identification card and six uniform patches that attest to your successful performance (passing score) on the examination.

### ***Who is eligible for NGA's Certified Auto Glass Technician examinations?***

Before you schedule your examination, be certain that you have been employed as an auto glass technician for the appropriate number of months or years. The minimum requirements are:

- Certified Auto Glass Technician (CAGT) examination: a minimum of 6 months work experience in the auto glass industry as an auto glass technician.
- Certified Master Auto Glass Technician (CMAGT) examination: a minimum of 3 years work experience in the auto glass industry as an auto glass technician *and* prior achievement of the Certified Auto Glass Technician designation.

*Note: If you are an experienced technician and wish to become certified at the master level, you must first achieve the Certified Auto Glass Technician designation.*

### ***What is the certification fee?***

Call NGA toll-free at 866/DIAL NGA (342-5642) extension 130 for the applicable fee.

### ***How do I register for an examination?***

Complete, sign, and mail or fax the registration form, checklist, *and* the examination fee (check or credit card) to: National Glass Association, Certified Auto Glass Technician Program, 8200 Greensboro Drive, Suite 302, McLean, VA 22102-3881; fax 703/442-0630. You may also register online with a credit card (Visa, MasterCard, American Express) at [www.glass.org](http://www.glass.org).

In all correspondence, be sure to give your name, address, telephone number and Personal Identification Number or the last four digits of your Social Security Number.

NGA will mail you a registration confirmation letter. This will arrive about two weeks after you send in your registration form and payment.

*Note: Your examination registration expires after one year. If your registration expires before you wish to take the examination, contact NGA for registration renewal.*

### ***How do I schedule an examination?***

After you receive your registration confirmation letter, contact NGA's examination provider, LaserGrade Computer Testing, using the toll-free exam hotline: **800/211-2754**. You must have ready **all** of the following information:

- Your personal information:
  - Last name, first name, and middle initial
  - 5 Digit Personal Identification Number
  - Home address
  - Home phone number
  
- Your employment information:
  - Company name
  - Company address
  - Company primary phone number
  - Company fax number

*Note: Once a candidate's record has been pulled from the authorization file, it must be completed. If for any reason the registration was not completed and a call back is necessary to complete registration, inform the Customer Service Representative that you have a current registration record that must be completed. Your record will **NOT** be in the Authorization File.*

NGA's examination provider, LaserGrade, will not schedule an examination for anyone who has not been authorized by the NGA and who does not have an authorization record on file. To be authorized you must have submitted the registration form, checklist and fee to NGA. Once NGA receives these items, a confirmation will be mailed to you informing you that you are authorized to register for the exam. **Do not** contact the exam scheduling center until you receive this confirmation.

It is a good idea to schedule your examination as early as you can after registering to ensure that the testing center has an appointment available for the date and time you prefer. Once you have scheduled your examination, your examination fee is not refundable.

If for some reason, you cannot keep a scheduled examination appointment; you may reschedule the appointment without penalty, if you notify the testing center 48 hours in advance. If you fail to notify LaserGrade at least 48 hours before the scheduled exam time, the exam fee will **not be**

**refunded.** You will be required to re-register and pay the exam fee again to take the certification exam.

### ***Where do I take the examination?***

Examinations are administered at testing centers nationwide and in Canada operated by NGA's examination provider. You can learn the location of the center nearest you by using the toll-free exam hotline: **800/211-2754** or by visiting the test center web site at **www.lasergrade.com**. On this site follow these steps:

- Select "Find a Test Center."
- Enter your zip code.
- Select "National Glass Association" for Sponsor and click "Find a Testing Center."
- The four closest testing locations will be listed along with directions to the testing center. You may change the search for test locations to show more than four testing locations.

Note: You must call LaserGrade at **800/211-2754** to schedule your exam. You will take your NGA examination at the testing center by entering answers to multiple choice items on a computer.

### ***Are special accommodations available?***

Special testing arrangements are available for candidates with disabilities. To request a special accommodation, send a registration form and a completed accommodation request form to NGA. An accommodation request form is available from NGA.

*Note: All registrations requiring special accommodations must receive specific approval from NGA prior to scheduling the examination.*

Once NGA has notified you of the approval of your special accommodations request you may call LaserGrade to schedule your exam. Call 800/211-2754 and ask to speak with the **ADA Coordinator**. You must schedule/reschedule your appointments with the ADA Coordinator.

### ***Are foreign language interpreters available?***

The use of a language interpreter is prohibited. Because NGA cannot guarantee consistent translation of examinations, this practice is not available.

***Are study materials available?***

You may purchase the optional study materials from NGA by calling toll-free 866/DIAL NGA (342-5642), extension 130, or by visiting our website at [www.glass.org](http://www.glass.org). For a list of additional reference materials visit our website.

***What should I expect at the examination?***

Each computer-administered examination covers a range of topics which auto glass industry experts have judged appropriate. Exam items (questions) are based on the industry-approved exam specifications, which provide an outline of the areas of knowledge required for a Certified Auto Glass Technician.

***Are sample examination items available?***

The following are sample examination items (questions) for the **Technician** examination:

1. Which of the following activities does NOT require the use of safety glasses?
  - a. Using hand tools
  - b. Dispensing chemicals
  - c. Driving a company vehicle
  - d. Working with glass
  
2. What does the acronym HAZCOM refer to?
  - a. Hazard community program
  - b. Hazard communications standard
  - c. Hazard comparison standard
  - d. Hazard complete program
  
3. A fender cover is used for all of the following reasons EXCEPT to:
  - a. prevent injury
  - b. prevent tools from rolling
  - c. protect finish
  - d. protect clothing

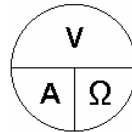
4. Which of the following Federal Motor Vehicle Safety Standards (FMVSS) pertains to automotive rollover?
  - a. 111
  - b. 208
  - c. 212
  - d. 216
  
5. Frost or condensation on the pinchweld will
  - a. eliminate the need for a primer to the metal
  - b. inhibit adhesion of urethane
  - c. increase the chance of stress cracking
  - d. require the use of a butyl dam
  
6. Compared to butyl tape, a cured urethane adhesive has
  - a. less durability
  - b. a lower viscosity
  - c. a much higher rubber content
  - d. much higher strength
  
7. Which of the following is needed in order for a rear defogger to operate properly?
  - a. A strong AC current supply
  - b. Proper power and ground connections
  - c. A leak-free seal
  - d. A highly polished grid system
  
8. When replacing the door glass on the 1997-99 Cadillac Sedan DeVille, what must the technician do to disable the door-mounted side airbag system?
  - a. Remove the door trim panel, then unbolt and isolate the ground strap from the airbag module
  - b. Remove the SIR fuse from the fuse panel accessed through the trunk of the vehicle
  - c. Remove the door trim panel and remove the SIR fuse mounted at the base of the airbag module
  - d. Remove the SRS fuse from the fuse panel found under the left edge of the dashboard

Answers: 1. c; 2. b; 3. a; 4. d; 5. b; 6.d; 7. b; 8. b

The following are sample examination items (questions) for the **Master** exam:

1. A D-Class fire extinguisher should be used on which of the following types of fires?
  - a. Molten metal
  - b. Electrical
  - c. Combustible
  - d. Chemical
2. Using Ohm's law, what is the voltage in a circuit if the current is 12 amps. and the resistance is 6 ohms?

**Ohm's Law**



- a. .5 volts
  - b. 2 volts
  - c. 12 volts
  - d. 72 volts
3. The best way to prevent any bumps when re-gluing a vinyl top is to
    - a. re-pad the roof surface to be covered
    - b. sand the entire roof surface with a heavy grit sandpaper
    - c. remove old glue deposits from the vinyl and roof
    - d. clean the vinyl and roof with a heavy-duty industrial solvent
  4. Older model GM pick-ups, 1967-72 DW 685, are considered a very difficult installation because of the
    - a. hard plastic insert
    - b. vulcanized gasket
    - c. pinchweld retainer teeth
    - d. double lipped gasket
  5. What is used to edge glass after it is cut?
    - a. Bench grinder
    - b. Fine tooth file
    - c. Belt grinder
    - d. Rubbing compound and buffing wheel

6. The ANSI Standard was developed for all of the following reasons EXCEPT
- a. to provide a comprehensive auto glass replacement standard
  - b. to promote public awareness of the need for safe installation procedures
  - c. to guide the industry in returning a safe vehicle to every customer
  - d. to give the auto glass industry specific guidelines for proper replacement of auto glass
7. Which Federal Motor Vehicle Safety Standard (FMVSS) governs the issues of transparency, strength, and long-term durability of auto glass?
- a. 205
  - b. 208
  - c. 212
  - d. 216

Answers: 1. a; 2. d; 3. c; 4. d; 5. c; 6.d; 7. a

***What should I expect on the day of the examination?***

Be sure to arrive at the testing center at least 15 minutes early. Before being admitted, you will be required to show two forms of identification -- **Primary form of identification** must be a federal or state government issued photo ID. (State-issued driver's license or identification card, passport, active military identification) **Secondary form of identification** must be a valid credit card or a Social Security Card. (In keeping with FTC guidelines to prevent identity theft, it is not recommended carrying your Social Security card. If it is the only secondary form of identification you have, it will be accepted by LaserGrade.)

*Note: If for any reason, you cannot take the exam on the scheduled date and time, call 800/211-2754 and reschedule the exam, at least 48 hours in advance to avoid forfeiting your exam fee. If you fail to notify LaserGrade at least 48 hours before the scheduled time, the exam fee will **not** be refunded. You will be required to re-register and pay the exam fee again to take the certification exam.*

You will be shown to a computer and given operating instructions. A practice program, to familiarize you with taking an examination on the computer, will be run. No prior knowledge of computers or typing is

needed to take the examination. Once the examination begins, you will have 90 minutes to complete it.

The computerized examination allows you to skip items temporarily, then return to them after you have seen all of the items. Before allowing you to exit the examination, the computer will notify you about the items that you have marked for review or those that remain unanswered. Upon your completion of the examination, you will receive your examination results. You will learn immediately whether you passed the examination.

### ***What are the testing center regulations?***

The testing center regulations are:

- Candidates who arrive after their scheduled time will be required to reschedule the examination. Arrive at least 15 minutes before your scheduled time.
- Candidates must present **two forms of identification**:  
**Primary** form of identification must be a federal or state government issued photo ID. (State-issued driver's license or identification card, passport, active military identification)  
**Secondary** form of identification must be a valid credit card or a Social Security Card. (*In keeping with FTC guidelines to prevent identity theft, it is not recommended carrying your Social Security card. If it is the only secondary form of identification you have, it will be accepted by LaserGrade.*)
- No electronic devices (pagers, palm pilots or cell phones) are allowed in the examination room. Only non-programmable, silent calculators that do not require electrical outlets may be taken into room. No reference materials or notes of any kind will be permitted.
- No exam materials, documents, or memoranda of any sort may be taken from the examination.
- Visitors will not be permitted in the examination room.
- Testing center personnel will be instructed to answer questions about examination procedures only. They cannot respond to inquiries regarding examination content.
- Any candidate giving or receiving assistance of any kind, or found making a disturbance, will be required to turn in examination materials and leave the testing center. Examinations from candidates who violate these security guidelines, or from those who attempt to impersonate another candidate, will not be scored. The candidate's examination fee will not be refunded.

- Once a date and time has been scheduled to take the exam, LaserGrade requires 48 hours notification to reschedule. If the candidate fails to notify the LaserGrade at least 48 hours before the scheduled time, the exam fee will **not** be refunded. The candidate will be required to re-register and pay the exam fee again to take the certification exam.

***When will I receive a score report?***

You will receive immediate pass/fail results when you complete your certification examination. Permanent certification records maintained by NGA contain only a pass/fail indication, not a numeric or scaled score.

***When may I retake the examination if I fail it?***

If you fail the examination, you must wait 30 days before taking it again.

***The cost of retesting is the same as the cost of the original examination.***

If you fail a second time, you must wait an additional 30 days before taking the next examination. If you fail a third time, you must wait 6 months before taking another exam. After waiting 6 months, the examination retest schedule begins all over again (waiting 30 days, 30 days and 6 months).

***How is the examination scored?***

The score you receive on the exam is a “scaled score.” Since there is more than one form for both, the technician and master exams, NGA’s exam development company has ensured that the exams are equal in difficulty within each certification level. There is a mathematical adjustment across all forms of the exam to ensure that one form is not easier or more difficult than the other forms.

The passing scaled score for the exam is 75. If your reported scaled score is equal to or greater than 75, then “PASS” appears on your score report. If your scaled score is less than 75, “FAIL” appears on your score report. If a failed score appears, your score and the exam topics will be listed with an indication of the acceptable performance or recommended additional study items.

It is important to remember that a 74 on the exam does NOT mean you have missed passing by only one item, because, a scaled score is NOT a percentage score. It is very possible that you have missed passing by more than one item.

A scaled score is a standard method of scoring. It is extremely reliable in ensuring exam fairness.

***How do I submit comments about the testing?***

Comments or concerns about how the examination was administered, or item challenges must be delivered in writing. Mail your comments to Certified Auto Glass Technician Program, National Glass Association, 8200 Greensboro Drive, Suite 302, McLean, VA 22102-3881. You may also fax your comments to 703/442-0630. Please include:

- Your name, address, 5 Digit Personal Identification Number (or Social Security) and phone number.
- Your test date.
- Your testing center location (found on the results form).

Direct all inquiries and comments about eligibility and procedures for registration to NGA as above.

***When will my certification be issued?***

When you have met all the certification eligibility criteria, your certification will be issued approximately 8 weeks after NGA receives your official passing notice. At that time, NGA will mail you the following materials:

- Certification certificate.
- Wallet identification card. (Call NGA for details about replacement of a lost or damaged card.)
- 6 complimentary uniform patches.

*Note: Replacement patches can only be obtained by contacting NGA toll-free at 866/DIAL NGA (342-5642) extension 130.*

- A form for a complimentary one-year subscription to **AutoGlass™**. (You must fill out the form, sign it, and mail it in order to get your subscription.)

***What are the privileges of NGA certification?***

- The right to use (in accordance with specific licensing regulations) the credentials for the certification level you have achieved: Certified Auto Glass Technician (CAGT) or Certified Master Auto Glass Technician (CMAGT).

- The right to display the appropriate uniform patch.
- The right to purchase optional certification products according to your certification level.

***Are examination results ever released?***

To maintain confidentiality, NGA does not share, sell, or circulate certification records.

***How can others verify my participation?***

To provide information without compromising participant privacy, each participant is identified by a specific identifying code that has five digits which can be found on the participant's confirmation letter or by the last four digits of the participant's Social Security number.

*Note: The release of information is restricted to certification program and company participants. Encrypted code is based upon information provided to NGA on the candidate's registration form.*

***Can my employer verify my certification?***

Employers and consumers may contact NGA for a technician's certification status. NGA will release only the following information:

- Certification level.
- Status (active or expired).
- Effective date.
- Expiration date.

*Note: Please notify NGA when you change employers.*

***How will I know when to renew my certification?***

Certification renewal is required every three years. NGA will notify you in writing, approximately 60-90 days before the expiration of your certification, so that you may renew your certification. If your certification status is current at the time of renewal, and you meet the eligibility requirements for Certified Master Auto Glass Technician, you can proceed to that level, if desired. If your certification has expired by the time of renewal, you must renew at the expired certification level. *Masters that let their certification expire will have to pass the Technician test before they are allowed to take the Master test.*

### ***What are the requirements/options for certification renewal?***

The requirements for certification renewal, is to sit for and pass the certification examination or you can earn credits through NGA Continuing Education. Our program is a great way to recertify and keep your knowledge up to date. Plus, it reinforces your reputation as an auto glass expert. For more information about the Continuing Education program please read the section “Continuing Education for Certification Renewal” on page 29.

### ***Why do I need to renew my NGA certification every three years?***

Auto glass technicians are on the front lines of keeping people safe in their vehicles. They need to show that they are knowledgeable about the latest techniques and information. Many professional fields require certification renewal.

### ***Can NGA certification be revoked?***

The Certified Auto Glass Technician Program is important to the industry and provides certain entitlements to successful candidates; therefore, it is essential to maintain the integrity and prestige of the program. All certified technicians are expected to exemplify the highest legal and ethical principles, to abide by the rules put into effect by the NGA Auto Glass Certification Council, and to comply with applicable laws. Any transgression or violation of these principles, rules or laws may constitute grounds for appropriate disciplinary action, including censure, suspension or revocation of certification. Any violation of this nature affecting the Certified Auto Glass Technician Program should be brought to the attention of the NGA Auto Glass Certification Council, which may take appropriate disciplinary measures after providing notice of the intended action and an opportunity for the individual in question to be heard. The decision of the NGA Auto Glass Certification Council shall be final and cannot be appealed.

### **Summary**

Providing technical information and education for the auto glass industry is a high priority for NGA. To meet this priority, NGA has developed the Certified Auto Glass Technician Program in addition to other technical, safety and managerial programs. NGA is committed to providing the glass industry with educational materials and training programs at all levels, from entry level to senior management.

## NGA Auto Glass Certification Checklist

Registration form, checklist and examination fee

- Completed?
- Signed?
- Mail or faxed to NGA or registered on NGA's web site?

Registration confirmation

- Confirmation letter received?
- Have you called LaserGrade at 800/211-2754 to schedule your exam?

Exam Date \_\_\_\_\_

Time \_\_\_\_\_

Location \_\_\_\_\_

Take to the Exam

- Primary form of identification? (state-issued driver's license or identification card, passport, active military identification)
- Secondary form of identification? (valid credit card or Social Security Card)

*Note: **DO NOT** bring electronic devices such as cell phones, palm pilots, programmable calculators, or pagers. **ONLY** non-programmable calculators are allowed.*



## EXAMINATION SPECIFICATIONS

### How to use these Tables

The tables below summarize the auto glass knowledge categories from the job survey conducted industry wide. This information has been divided into knowledge areas called classes. These classes together add up to 100% of what candidates need to know to become a certified auto glass technician or certified master auto glass technician. For example, in the certified auto glass technician table, the knowledge area “safety” is 14% of the exam. Under this major topic or “Class” are 8 specific sub-topics that make up the items or Class. Also listed is the approximate number of questions on the exam from each knowledge area.

Make sure to review each knowledge area to determine the specific topics of study. All areas should be reviewed and understood.

### CERTIFIED AUTO GLASS TECHNICIAN EXAM SPECIFICATIONS

<b>Class Code</b>	<b>Knowledge</b>
<b>A</b>	<b>Area 1: Safety Procedures (14% of Exam - approximately 10 questions)</b>
	<i>Knowledge of:</i>
<b>A1</b>	safe operation of tools
<b>A2</b>	safe practices when working with electrical systems
<b>A3</b>	personal protective equipment (PPE) (for example, gloves, safety glasses, footwear)
<b>A4</b>	safe lifting, handling, and storage procedures (for example, glass, equipment, materials, tools)
<b>A5</b>	potentially dangerous behavior (for example, substance abuse, reckless behavior)
<b>A6</b>	safety standards (for example, HAZCOM, OSHA, [WHMIS, WCB in Canada])
<b>A7</b>	basic first aid (for example, cuts, burns, eye injuries)

<b>A8</b>	policies and procedures to ensure safety of technician, coworkers, customers, and general public
<b>B</b>	<b>Area 2: Glass Service (including in-shop and mobile installation, service of glass and related parts, side view mirror replacement, and windshield repair) (77% of Exam- approximately 54 questions)</b>
	<i>Knowledge of:</i>
<b>B1</b>	pre-inspection checklist items (for example, scratches, dents, chips, stains, damaged antennas)
<b>B2</b>	causes and types of glass breakage
<b>B3</b>	vehicle protection materials (for example, drop cloths, pads, covers, protective tape)
<b>B4</b>	vehicle protection procedures (for example, proper use of tools, removal of technician jewelry, belt buckles)
<b>B5</b>	reference materials -- for example, National Auto Glass Specifications (NAGS) catalog and calculator, interchangeability chart, Material Safety Data Sheet (MSDS), NAGS Air Bag Quick Reference Guide, product technical data sheets
<b>B6</b>	procedures for documentation of conditions and materials related to service (for example, lot numbers, expiration dates, part numbers, temperature, humidity)
<b>B7</b>	regulations and standards from government, OEM, and other recognized agencies and groups (for example, Federal Motor Vehicle Safety Standards [FMVSS], Department of Transportation [DOT], Insurance Institute for Highway Safety)
<b>B8</b>	OEM specifications pertaining to installations
<b>B9</b>	differences between OEM and non-OEM products
<b>B10</b>	storage procedures
<b>B11</b>	adhesives and sealants
<b>B12</b>	value-added glass parts (for example, encapsulated, heated, pre-applied adhesive systems [PAAS], heads-up display, rain sensor)

<b>B13</b>	safety glass and related materials (for example, laminated, tempered, polycarbonate)
<b>B14</b>	hand, power, and specialized tools
<b>B15</b>	electrical systems
<b>B16</b>	types of gaskets
<b>B17</b>	vehicle body construction (for example, body seams, drains, air vents, gaskets, drip rails)
<b>B18</b>	glass removal techniques for urethane, gasket, and butyl installations
<b>B19</b>	non-glass parts and trim
<b>B20</b>	installation and repair techniques for non-glass parts and trim
<b>B21</b>	removal techniques for non-glass parts and trim
<b>B22</b>	interior door parts (for example, regulators, linkages, channels, motors, airbags)
<b>B23</b>	airbag disabling, removal, handling, installation, and arming procedures
<b>B24</b>	windshield installation methods (for example, urethane, gasket, butyl)
<b>B25</b>	door and vent glass installation methods (for example, bolted, riveted, channel, bonded)
<b>B26</b>	quarter and back glass installation methods (for example, urethane, channel, bolted, gasket)
<b>B27</b>	installation and repair procedures in various environmental conditions
<b>B28</b>	custom accessories (for example, carriage roofs, roof visors, window tinting, antenna, sensors)
<b>B29</b>	procedures and equipment for OEM sunroof replacement and service
<b>B30</b>	bonding surface preparation techniques
<b>B31</b>	test equipment (for example, window bypass kit, digital volt ohmmeter [DVOM], leak detectors, test lights)
<b>B32</b>	tests for leak detection (for example, electronic, air, water)
<b>B33</b>	procedures and materials used in cleaning vehicle after glass service

<b>B34</b>	after market paint considerations (for example, tape, pinchweld preparation, molding removal)
<b>B35</b>	causes of rust and corrosion (for example, exposed metal, dissimilar metals, silicone, water)
<b>B36</b>	effects of rust and corrosion on installation (e.g., stress cracks, leaks, adhesive failure, structural integrity)
<b>B37</b>	rust and corrosion repair recommendations
<b>B38</b>	reparability of value-added windshields (for example, heated, rain sensor, insulated)
<b>B39</b>	reparability of windshield based on damage characteristics (for example, acute area, size or type of damage)
<b>B40</b>	expected outcome of an installation and/or repair
<b>B41</b>	windshield repair system procedures and equipment
<b>C</b>	<b>Area 3: Pattern Making (9% of Exam- approximately 6 questions)</b>
	<i>Knowledge of:</i>
<b>C1</b>	pattern making for glass fabrication
<b>C2</b>	trade mathematics

## **CERTIFIED MASTER AUTO GLASS TECHNICIAN EXAM SPECIFICATIONS**

<b>Class Code</b>	<b>Knowledge</b>
	<b>Area 1: Safety (e.g., OSHA/WCB) (25% of Exam - approximately 12 questions)</b>
	<i>Knowledge of:</i>
	<b>A. Safety</b>
	HAZCOM, MSDS, and WHMIS
	fire safety
	safe electrical practices
	bloodborne pathogens
	machine guarding
	lock out / tag out
	ergonomics
	advanced first aid (e.g., control of bleeding, treatment for shock)
	personal protective equipment (PPE) (e.g., qualified training in use of PPE)
	<b>Area 2: Troubleshooting (30% of Exam - approximately 15 questions)</b>
	<i>Knowledge of:</i>
	<b>A. Electrical (10% of Exam - approximately 5 questions)</b>
	electrical terminology/definitions (e.g., amps, voltage, ohms)
	electrical schematics

low voltage systems
testing procedures
specialized tools
<b>B. Noise/Leak Detection (20% of Exam - approximately 10 questions)</b>
advanced noise/leak detection methods and recommendations
causes of noise/leaks (e.g., manufacturing defects, material defect, deterioration, after-market modifications, collisions)
<b>Area 3: Complex/Unusual Installations (15% of Exam - approximately 8 questions)</b>
<i>Knowledge of:</i>
<b>A. Complex/Unusual Installations</b>
advanced diagnosis, service, and replacement of OEM sunroofs
replace and service T-tops
glass service with vinyl roofs
corrosion management
unusual vehicles (e.g., custom, vintage)
<b>Area 4: Glass Cutting (15% of Exam - approximately 8 questions)</b>
<i>Knowledge of:</i>
<b>A. Glass Cutting</b>
handling and storage procedures
composition of safety glass (e.g., laminated, tempered, polycarbonate)
geometry (i.e., making a pattern from dimensions)
labeling and applied markings

glass cutting – straight cutting, curved cutting
finishing the glass
special fabrication (e.g., hole drilling, notches)
<b>Area 5: Industry Information (15% of Exam-approximately 8 questions)</b>
<i>Knowledge of:</i>
<b>A. Industry Information</b>
ANSI Standards for Auto Glass
FMVSS (111, 205, 208, 212, 216)
NHTSA (1397a2a)
research materials and resources (e.g., Internet, trade magazines, OEM service manuals, newsletters, trade shows)

*Note: In addition to the information listed at the end of this handbook, all master technicians are expected to be familiar with the safe operation of the appropriate powered and non-powered industry-specific hand tools. They are also expected to be able to contact the vehicle manufacturer, glass manufacturer, adhesive manufacturer, or other industry suppliers to obtain appropriate information or procedures on problem areas or new materials.*

## **CERTIFIED MASTER AUTO GLASS TECHNICIAN EXAM STUDY REFERENCES**

### Safety

- *American Red Cross. Community First Aid and Safety.* San Bruno: StayWell, 2002.
- *Hazard Communications (HAZCOM)*  
[www.osha.gov/SLTC/hazardcommunications/index.html](http://www.osha.gov/SLTC/hazardcommunications/index.html)
- *Fire safety* [www.osha.gov/SLTC/firesafety/index.html](http://www.osha.gov/SLTC/firesafety/index.html)
- *Safe electrical practices* [www.osha.gov/SLTC/electrical/index.html](http://www.osha.gov/SLTC/electrical/index.html)
- *"Occupational Exposure to Blood Borne Pathogens" ..*  
[www.osha.gov/Publications/osha3186.pdf](http://www.osha.gov/Publications/osha3186.pdf) (Adobe Acrobat File)
- *Machine guarding* [www.osha.gov/SLTC/machineguarding/index.html](http://www.osha.gov/SLTC/machineguarding/index.html)
- *Ergonomics* [www.osha.gov/ergonomics/index.html](http://www.osha.gov/ergonomics/index.html)
- *Lockout/Tagout* [www.osha.gov/SLTC/controlhazardousenergy](http://www.osha.gov/SLTC/controlhazardousenergy)
- *First Aid Hints*  
[www.mayoclinic.com/findinformation/firstaidandselfcare/index.cfm](http://www.mayoclinic.com/findinformation/firstaidandselfcare/index.cfm)
- *Insurance Institute for Highway Safety* [www.hwysafety.org](http://www.hwysafety.org)
- *National Highway Transportation Safety Administration*  
[www.nhtsa.gov](http://www.nhtsa.gov)
- *OSHA Hazard Communications Standard 29 CFR 1910.1200*  
[www.osha.gov/SLTC/hazardcommunications/standards.html](http://www.osha.gov/SLTC/hazardcommunications/standards.html)
- *Blood Borne Pathogens* [www.cdc.gov/hiv/pubs/facts/transmission.htm](http://www.cdc.gov/hiv/pubs/facts/transmission.htm),  
[www.cdc.gov/mmwr/preview/mmwrhtml/rr5011a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5011a1.htm)
- *Fire Safety* [www.osha.gov/SLTC/firesafety/index.html](http://www.osha.gov/SLTC/firesafety/index.html),  
[www.osha.gov/pls/oshaweb/owadispl.show\\_document?p\\_table=STANDARDS&p\\_id=9811](http://www.osha.gov/pls/oshaweb/owadispl.show_document?p_table=STANDARDS&p_id=9811)
- *OSHA Training Manuals* [www.jjkeller.com](http://www.jjkeller.com), [www.safety2.blr.com](http://www.safety2.blr.com)
- *Auto Glass Technician Reference Manual 2001* [www.glass.org](http://www.glass.org)
- *Back Injury* [www.des.umd.edu/compliance/factsheet/back.html](http://www.des.umd.edu/compliance/factsheet/back.html)
- *Collision Repair Report Newsletter* [www.asashop.org/index.htm](http://www.asashop.org/index.htm)

### **Troubleshooting, Complex/Unusual Installations, Glass Cutting**

- Horner, Jim. *Automotive Electrical Handbook.* Berkley Publishing Group, 1986.
- Munday, Frank. *Custom Auto Electronics and Auto Electrical Reference Manual.* Graffiti Publications (AU), 1998.
- Radio, Skip. *How to Do Electrical Systems: Most Everything About Auto Electrics. 2nd Edition.* Hot Rod Library, 2001.
- Young, Richard A. and Thomas J. Glover. *AutoRef.* Littleton: Sequoia Publishing, Inc, 2003.

## **National Auto Glass Specifications**

- Current *NAGS® CATALOG Domestic and Foreign Glass Parts* [www.nags.com](http://www.nags.com)
- Current *Nags Air Bag Quick Reference Guide* [www.nags.com](http://www.nags.com)
- Current *NAGS® CALCULATOR Domestic and Foreign Glass Parts. National Auto Glass Specifications* [www.nags.com](http://www.nags.com)
- *Auto Glass Technician Reference Manual 2001* [www.glass.org](http://www.glass.org)

## **Industry Information**

- *Auto Glass Installation Guides.* [www.glass.org/autoglass/agigcontents.htm](http://www.glass.org/autoglass/agigcontents.htm), [www.glass.org/autoglass/installations.htm](http://www.glass.org/autoglass/installations.htm)
- *ANSI/AGRSS 001-2002 Auto Glass Replacement Safety Standard* [www.safewindshields.com](http://www.safewindshields.com)
- *Auto Glass Technician Reference Manual 2001.* [www.glass.org](http://www.glass.org)
- *Department of Transportation* [www.DOT.gov](http://www.DOT.gov)
- *Federal Motor Vehicle Safety Standards and Regulations/U.S. Department of Transportation.* [www.nhtsa.dot.gov/cars/rules/import/FMVSS/](http://www.nhtsa.dot.gov/cars/rules/import/FMVSS/)
- *National Highway Transportation Safety Administration. Auto safety hot line* [www.nhtsa.gov/hotline](http://www.nhtsa.gov/hotline)
- *Airbag information* [www.iihs.org/safety\\_facts/airbags/airbags.htm](http://www.iihs.org/safety_facts/airbags/airbags.htm)
- *Insurance Institute on Highway Safety.* [www.hwysafety.org](http://www.hwysafety.org)
- *Recommended Practices for the Repair of Windshields. National Windshield Repair Association, 1998.* [www.n-w-r-a.org](http://www.n-w-r-a.org)
- OSHA 29 CFR 1910.157(d)(2) [www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STAN DARDS&p\\_id=9811](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=9811)
- OSHA 29 CFR 1910.1030(c)(1)(i) [www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STAN DARDS&p\\_id=10051](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=10051)
- OSHA 29 CFR 1910.305(G)(1)(iii) [www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STAN DARDS&p\\_id=9882](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=9882)
- OSHA 29CFR 1910.1030 [www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STAN DARDS&p\\_id=10051](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=10051)
- OSHA 29 CFR 1910.243(a)(2)(ii) [www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STAN DARDS&p\\_id=9850](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=9850)

- OSHA 29 CFR 1910.95  
[www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STAN DARDS&p\\_id=9735](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=9735)
- OSHA 29 CFR 1910.215(a)(4)  
[www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STAN DARDS&p\\_id=9839](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STAN DARDS&p_id=9839)
- DVOM Operation Manual
- Safeguard Glass Installation Guide
- NHTSA Safety Act of 1966 - NHTSA (1397a2a) and (a1a)
- FMVSS 571.205; 571.208; 571.111; 571.212, and 571.216

### **Automobile Manufacturers**

**Acura** 1-800-382-2238  
[www.acura.com](http://www.acura.com)

**AM General** 1-800-348-6833  
[www.hummer.com](http://www.hummer.com)

**Audi** 1-800-822-2834  
[www.audiusa.com](http://www.audiusa.com)

**BMW** 1-800-831-1117  
[www.bmwusa.com](http://www.bmwusa.com)

**Buick** 1-800-521-7300  
[www.buick.com](http://www.buick.com)

**Cadillac** 1-800-458-8006  
[www.cadillac.com](http://www.cadillac.com)

**Chevrolet** 1-800-222-1020  
[www.chevrolet.com](http://www.chevrolet.com)

**Chrysler** 1-800-992-1997  
[www.chrysler.com](http://www.chrysler.com)

**Daewoo** 1-888-643-2396  
[www.daewoocars.com](http://www.daewoocars.com)

**Dodge** 1-800-992-1997  
[www.4adodge.com](http://www.4adodge.com)

**Ford** 1-800-392-3673  
[www.ford.com](http://www.ford.com)

**GMC** 1-800-462-8782  
[www.gmc.com](http://www.gmc.com)

**Lexus** 1-800-255-3987  
[www.lexus.com](http://www.lexus.com)

**Lincoln** 1-800-392-3673  
[www.lincolnvehicles.com](http://www.lincolnvehicles.com)

**Mazda** 1-800-222-5500  
[www.mazdausa.com](http://www.mazdausa.com)

**Mercedes-Benz** 1-800-222-0100  
[www.mbusa.com](http://www.mbusa.com)

**Mercury** 1-800-392-3673  
[www.mercuryvehicles.com](http://www.mercuryvehicles.com)

**Mitsubishi** 1-800-222-0037  
[www.mitsubishicars.com](http://www.mitsubishicars.com)

**Nissan** 1-800-647-7261  
[www.nissandriven.com](http://www.nissandriven.com)

**Oldsmobile** 1-800-442-6537  
[www.oldsmobile.com](http://www.oldsmobile.com)

**Plymouth** 1-800-992-1997  
[www.chrysler.com](http://www.chrysler.com)

**Pontiac** 1-800-762-2737  
[www.pontiac.com](http://www.pontiac.com)

**Porsche** 1-800-545-8039  
[www.us.porsche.com](http://www.us.porsche.com)

**Saab** 1-800-955-9007  
[www.saabusa.com](http://www.saabusa.com)

**Honda** 1-800-999-1009  
[www.honda.com](http://www.honda.com)

**Hyundai** 1-800-633-5151  
[www.hyundaiusa.com](http://www.hyundaiusa.com)

**Infiniti** 1-800-662-6200  
[www.infiniti.com](http://www.infiniti.com)

**Isuzu** 1-800-255-6727  
[www.isuzu.com](http://www.isuzu.com)

**Jaguar** 1-800-452-4827  
[www.us.jaguar.com](http://www.us.jaguar.com)

**Jeep** 1-800-992-1997  
[www.jeepunpaved.com](http://www.jeepunpaved.com)

**Kia** 1-800-333-4542  
[www.kia.com](http://www.kia.com)

**Saturn** 1-800-553-6000  
[www.saturnbp.com](http://www.saturnbp.com)

**Subaru** 1-800-782-2783  
[www.subaru.com](http://www.subaru.com)

**Suzuki** 1-800-934-0934  
[www.suzukiauto.com](http://www.suzukiauto.com)

**Toyota** 1-800-331-4331  
[www.toyota.com](http://www.toyota.com)

**Volkswagen** 1-800-822-8987  
[www.vw.com](http://www.vw.com)

**Volvo** 1-800-458-1552  
[www.new.volvocars.com](http://www.new.volvocars.com)

## CONTINUING EDUCATION FOR CERTIFICATION RENEWAL

### Overview

The purpose of the continuing education program is to provide NGA Certified Auto Glass and Glazer Technicians with the opportunity and option to earn 30 Certification Credits (CCs) for certification renewal instead of sitting for the certification exam again. Taking the exam again for certification renewal, however, is always an acceptable option. Therefore, a candidate for certification renewal will either take the exam again or earn the required 30 CCs during the 3 years that his/her certification is valid.

*Note: Remember that passing the certification exam is required for initial certification.*

The time frame for earning the 30 CC's is 3 years. Once a candidate passes either the Certified Auto Glass Technician exam, Certified Master Auto Glass Technician exam or Glass Installer (Glazer) exam, the candidate must earn 30 CC's within the 3-year time frame that his/her certification is valid. Otherwise, the candidate will need to take and pass the exam again in order to renew his/her certification. If the candidate earns the 30 CC's through NGA-approved continuing education providers, the certification will be renewed for another 3 years.

Although it is the Continuing Education Provider's responsibility to inform NGA of a candidate's attendance at an approved program, candidates are required to keep their certificates of completion from the providers in their own files and submit them as requested by NGA. In the unlikely event of disagreement, candidates may need to produce their certificates of completion as proof of attendance. In addition, NGA may request to review a candidate's files in the context of routine program auditing.

Certification Credits are awarded by Providers in the following format:

50-60 minutes	=	1 contact hour
30-49 minutes	=	.5 contact hour
Less than 30 minutes	=	not counted

*Note: Credit is awarded for educational time only. Credit is not awarded for program registration, class breaks, meals, travel, receptions, and so forth. Where a presentation occurs at a meal, credit is not awarded for the time spent eating.*

## **Continuing Education Renewal Fees**

Member: \$99.95

Non-member: \$199.90

## **Candidate Requirements for Continuing Education**

The certification levels that are eligible to be renewed by earning CCs are: Auto Glass Technician, Auto Glass Master and the Glass Installer certification. The overall number of required Certification Credits to be earned is 30. Please review the following certification listing to determine what CCs must be earned in order to renew your certification:

### **Certified Auto Glass Technician**

General Categories Breakdown: 30 Certification Credits (CC's) required within the 3-year eligibility time frame.

Safety	6
Glass Service	23
Pattern Making	1
Total	30

See the following table for a breakdown of CC's and applicable category subtopics.

*Note: CC's for a particular category must be divided among the subtopics. Not all the required CC's can be earned in only one subtopic. Example: The 6 safety CC's must be divided among the 8 safety subtopics.*

### **Safety Procedures (6 CCs)**

- Safe operation of tools
- Safe practices when working with electrical systems
- Personal Protective Equipment (PPE)
- Safe lifting, handling, and storage procedures
- Potentially dangerous behavior
- Safety Standards (HAZCOM, OSHA, WHMIS, WCB)
- Basic first aid
- Policies & procedures to ensure safety of technician, coworkers, customers, and the general public

### **Adhesives (4 CCs)**

- Procedures for documentation of conditions and materials related to

service (i.e., lot numbers, expiration dates, part numbers, temperature, humidity)

- Adhesives and sealants
- Bonding surface preparation techniques

### **Installation (11 CCs)**

- Pre-inspection checklist items
- Causes and types of glass breakage
- Vehicle protection materials
- Procedures for documentation of conditions and materials related to service (i.e., lot numbers, expiration dates, part numbers, temperature, humidity) - Storage procedures
- Value-added glass parts
- Safety glass and related materials
- Electrical systems
- Types of gaskets
- Vehicle body construction
- Glass removal techniques for urethane, gasket, and butyl installations
- Non-glass parts and trim
- Installation and repair techniques for non-glass parts and trim
- Removal techniques for non-glass parts and trim
- Interior door parts
- Airbag disabling, removal, handling, installation, and arming procedures
- Windshield installation methods
- Door and vent glass installation methods
- Quarter and back glass installation methods
- Installation and repair procedures in various environmental conditions
- Custom accessories
- Procedures and equipment for OEM sunroof replacement and service
- Test equipment (window by-pass kit, DVOM, leak detectors, test lights)
- Tests for leak detection (electronic, air, water)
- Procedures and materials used in cleaning vehicle after glass service
- After-market paint considerations
- Causes of rust and corrosion
- Effects of rust and corrosion on installation
- Rust and corrosion repair recommendations
- Repairability of value-added windshields
- Repair of windshields based on damage characteristics (acute area, size or type of damage)
- Expected outcome of an installation and/or repair
- Windshield repair system procedures and equipment

### **Tools (4 CCs)**

- Vehicle protection procedures

- Hand, power, and specialized tools
- Glass removal techniques for urethane, gasket, and butyl installations
- Removal techniques for non-glass parts and trim
- Bonding surface preparation techniques
- Test equipment (window by-pass kit, DVOM, leak detectors, test lights)
- Tests for leak detection (electronic, air, water)
- Windshield repair system procedures and equipment

### **Industry Knowledge (4 CCs)**

- Causes and types of glass breakage
- Reference materials (NAGS publications, MSDS, interchangeability charts, product technical data sheets)
- Procedures for documentation of conditions and materials related to service (i.e., lot numbers, expiration dates, part numbers, temperature, humidity) - Regulations and standards from government, OEM, and other recognized agencies and groups
- OEM specifications relating to installations
- Differences between OEM and non-OEM products
- Value-added glass parts
- Safety glass and related materials
- Vehicle body construction
- Custom accessories
- Repairability of value-added windshields
- Repair of windshields based on damage characteristics (acute area, size or type of damage)

### **Pattern Making (1 CC)**

- Pattern Making

### **Certified Master Auto Glass Technician**

General Categories Breakdown: 30 Certification Credits (CC's) required within the 3-year eligibility time frame

Safety	8
Troubleshooting	3
Complex/Unusual Situations	2
Glass Cutting	1
Industry Information	4
Adhesives	4
Installations	6

Electives	2
Total	30

*Note: Electives may be earned in any of the listed categories or in NGA-approved alternative categories.*

See the following table for a breakdown of CC's and applicable category subtopics.

*Note: CC's for a particular category must be divided among the subtopics. Not all the required CC's can be earned in only one subtopic. Example: The 8 safety CC's must be divided among the 9 safety subtopics.*

### **Safety (8 CCs)**

- HAZCOM, MSDS, WHMIS
- Fire safety
- Safe electrical practices
- Blood borne pathogens
- Machine guarding
- Lock out/tag out
- Ergonomics
- Advanced first aid
- Personal Protective Equipment

### **Troubleshooting (3 CCs)**

- Electrical:
  - Electrical terminology and definitions
  - Electrical schematics
  - Low voltage systems
  - Testing procedures
  - Specialized tools
- Noise/Leak Detection:
  - Advanced noise & leak detection methods & recommendations
  - Causes of noise & leaks

### **Complex/Unusual Situations (2 CCs)**

- Advanced diagnosis, service, and replacement of OEM sunroofs
- Replacement & service of T-tops
- Glass service with vinyl roofs
- Corrosion management
- Unusual vehicles (e.g., custom, vintage)

### **Glass Cutting (1 CC)**

- Handling & storage procedures
- Composition of safety glass
- Geometry (e.g., pattern making from dimensions)
- Labeling & applied markings
- Glass cutting (straight & curved)
- Finishing the glass
- Special fabrication (e.g., hole drilling, notches)

### **Industry Information (4 CCs)**

- ANSI standards for auto glass
- FMVSS (111, 205, 208, 212, 216)
- NHTSA (1397a2a)
- Research materials & resources

### **Adhesives (4 CCs)**

- Procedures for documentation of conditions and materials related to service (i.e., lot numbers, expiration dates, part numbers, temperature, humidity) - Adhesives and sealants
- Bonding surface preparation techniques

### **Installation (6 CCs)**

- Pre-inspection checklist items
- Causes and types of glass breakage
- Vehicle protection materials
- Procedures for documentation of conditions and materials related to service (i.e., lot numbers, expiration dates, part numbers, temperature, humidity) - Storage procedures
- Value-added glass parts
- Safety glass and related materials
- Electrical systems
- Types of gaskets
- Vehicle body construction
- Glass removal techniques for urethane, gasket, and butyl installations
- Non-glass parts and trim
- Installation and repair techniques for non-glass parts and trim
- Removal techniques for non-glass parts and trim
- Interior door parts
- Airbag disabling, removal, handling, installation, and arming procedures
- Windshield installation methods
- Door and vent glass installation methods
- Quarter and back glass installation methods

- Installation and repair procedures in various environmental conditions
- Custom accessories
- Procedures and equipment for OEM sunroof replacement and service
- Test equipment (window by-pass kit, DVOM, leak detectors, test lights)
- Tests for leak detection (electronic, air, water)
- Procedures and materials used in cleaning vehicle after glass service
- After-market paint considerations
- Causes of rust and corrosion
- Effects of rust and corrosion on installation
- Rust and corrosion repair recommendations
- Repairability of value-added windshields
- Repair of windshields based on damage characteristics (acute area, size or type of damage)
- Expected outcome of an installation and/or repair
- Windshield repair system procedures and equipment

### **Electives (2 CCs)**

- Electives may be earned in any of the listed categories or in NGA-approved alternative categories.

### **Continuing Education Providers**

NGA reviews and approves/accepts all Provider program outlines before approval is given. Providers must submit their program outlines to NGA yearly for review and approval/acceptance. Providers agree to include learning outcomes and an evaluation method in their programs (quiz, question/answer session, and so forth.) It is the Provider's responsibility to provide each attendee with a certificate of completion as well as to forward a Program Attendance Form to NGA within 10 working days of a program's completion to document a candidate's attendance.

*Note: Candidates are also required to keep their certificates of completion from the Providers in their own files if they are requested by NGA to validate attendance and amount of earned credits.*

Some Providers may charge attendance fees for their programs. NGA does not require, dictate, or profit from Providers' fees. NGA is not responsible for refunding a student any fees related to attending an approved course. It is highly recommended that attendees/students become fully aware of refund policies before signing up for educational programs.

To find a Providers' programs, look for the NGA Continuing Education logo on Providers' promotional materials.

## **Preparing for the NGA Auto Glass Certification Test**

**By Dale Malcolm**

Training is an investment, and the better you and your employees are trained, the easier everyone's job will be. While it is always a good idea to brush up on any topic before an exam, last minute cramming can't substitute for genuine knowledge. Both the National Glass Association's Auto Glass Technician and Master Technician Certification Tests are meant to certify and validate that knowledge.

Though we have had many requests for a master-level study guide, you won't pass the test simply by reading a book before the test. A true technician or master should know the subject material well enough to take the test at any time.

### **Your Comfort**

The National Glass Association publishes exam specifics on NGA's Web site, [www.glass.org/cert/agrmnt\\_examspecs.htm](http://www.glass.org/cert/agrmnt_examspecs.htm). These "knowledges" or topics were gathered from the results of a survey of 3,000 certified auto-glass installers. The subjects were categorized and organized into groups, including how much of the total test score each area counts.

The Auto Glass Certification Committee and the Certification Council chose the topics included in the technician and master level tests. These can be found in NGA's Web site at [www.glass.org/cert/agrmnt\\_ov.htm](http://www.glass.org/cert/agrmnt_ov.htm). Careful review of the exam specifications will show some overlap in certain topics, but technician and master-level questions—such as those about safety—will have some differences. Technician-level safety answers are items employees should know to protect themselves; master-level safety answers are items an employer should know to protect the employees in the company. For example, a technician should know how to read a Material Safety Data Sheet, while the employer needs to know how often to conduct that training.

The technician-level test has 70 multiple-choice questions and the master-level test has 50. Installers may also be asked up to 20 extra pre-test questions verified for statistical and technical accuracy before being inserted into an actual test. If one of these questions appears to be technically incorrect, you can alert the Certification Committee. Notify the attendant before the test is over if you wish to challenge a question and always follow all rules set down by the test site.

### **Safety Program Information and Other Training Materials**

The following are sources of useful information on what safety subjects need to be taught to all employees and how to do that training.

Personal protective equipment, first aid, blood-borne pathogens and hazard-communication training, for example, must be taught to all new employees and may need annual refreshers for all employees. The U.S. Occupational Safety and Health Administration site, [www.osha.gov](http://www.osha.gov), is a great free source of safety training information. OSHA employee training publication [osha2254.pdf](#) gives an excellent overview and self-assessment guide for determining topics and frequency of training.

While the OSHA site is an excellent source of information, the vast amount of information can be intimidating. Among the companies that specialize in compiling training materials are J.J. Keller Inc. of Neenah, WI at [www.jjkeller.com](http://www.jjkeller.com) and Business & Legal Reports of Old Saybrook, CT at <http://safety2.blr.com>.

The National Glass Association and Auto Glass Certification Committee volunteers have combined all the previous three certification study guides—technician, senior and master—into the Auto Glass Technician Reference Manual, a large binder full of useful information and self-study materials. The National Glass Association also has other safety materials on its Web site. These reference guides, available for sale, and the vast amount of reference material available on the Internet cover everything contained in the NGA Auto Glass Certification Tests. To view a partial list, visit [www.glass.org](http://www.glass.org).

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