



PERSONNEL CERTIFICATION GUIDE

Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems (SPVC)



MAY 2012

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Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified

Purpose of this Handbook

This handbook provides information on the requirements to achieve and renew a Construction Electrician (NOC 7241) – Solar Photovoltaic (PV) Systems personnel certification.

This personnel certification guide is provided for informational purposes only. The most current version of this manual, as published on the CSA Group website, shall prevail in any case a discrepancy occurs between this version and the official released version of this guide.

About CSA Group

CSA Group (an operating name of the Canadian Standards Association (CSA) and its wholly owned subsidiary CSA America, Inc.) is a not-for-profit, membership-based, solutions-oriented organization, serving business, industry, government and consumers in North America and the global marketplace. Our corporate vision is a better, safer, more sustainable world where standards work for people and business. CSA Group achieves this goal by focusing on the development and delivery of standards and codes, application products, training, advisory services and personnel certification programs - all aimed at enhancing public safety, improving quality of life, preserving the environment and facilitating trade.

CSA Group is a division of CSA Group which also includes: CSA International, a provider of testing and certification services for electrical, mechanical, plumbing, gas and a variety of other products; and OnSpeX, a provider of consumer product evaluation, inspection and advisory services for retailers and manufacturers.

As technologies continue to grow and evolve, and as the labor force grows more mobile, so has the need for a method to consistently assess, certify and measure individual worker knowledge. In response to this growing need, CSA America, Inc. develops and manages personnel certification programs in North America to the requirements of ANSI/ISO/IEC 17024:2003 *General Requirements for bodies Operating Certification Systems of Persons*. Current operating programs include CNG (Compressed Natural Gas) Fuel System Inspector, Gas Laboratory Technicians, Greenhouse Gas Inventory Quantifier, Greenhouse Gas Verifier, and Certified Medical Device Reprocessing Technicians.

CSA Group is an ANSI Accredited Certifier – Accreditation # 0779 for the CNG Fuel System Inspector personnel certification program.

Certification Contact Information

US

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Personnel Certification Coordinator
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Phone: (877) 235-9791
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Email: training@csagroup.org
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CANADA

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Canada, L4W 5N6
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Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified

Acknowledgements

The development of this personnel certification was made possible by the generous financial and administrative support of the National Electrical Trade Council (NETCO). NETCO is a joint Labour-Management partnership of the International Brotherhood of Electrical Workers (IBEW), First District, Canada and the Canadian Electrical Contractors Association (CECA). It provides leadership through national coordination on workforce skills development and public policy issues of importance to the electrical industry in Canada.

Personnel Certification Scheme Committee

This personnel certification program was developed under the guidance of the CSA Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems Certification Scheme Committee.

S. Boorman	Electrical Contractors Association of Ontario
A. Cleven	Electrical Joint Training Committee, IBEW Local 213 and ECABC
J. Hogeterp	The K-Line Group of Companies
J. Kellett	The K-Line Group of Companies
C. Knight	National Photovoltaic Construction Partnership
B. Leverick	Alliance Energy Ltd.
C. MacLeod	Carol MacLeod & Associates Inc.
R. Matthews	Electrical Industry Training Centres of Alberta
R. Nelson	CSA Group
P. Olders	Ontario Electrical Industry Training Trust
T. Olechna	Electrical Safety Authority
J. Salmon	A.R. Milne Electric Ltd.
T. Simmons	British Columbia Institute of Technology
T. Stafford	National Joint Apprenticeship and Training Committee
B. Stevens	International Brotherhood of Electrical Workers, First District, Canada
T. Reid	International Brotherhood of Electrical Workers, First District, Canada
J. Tomona	Humber College of Applied Arts and Technology
W. Zheng	Canadian Solar Inc.

Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified

About this Certification

The Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems Certified (PVSC) Personnel Certification has been developed by CSA Group in conjunction with the National Electrical Trade Council (NETCO) and industry stakeholders to provide assurance that an individual possesses the competencies deemed necessary to perform the job function of a Solar Photovoltaic Systems Certified electrician. The certification is designed to complement accreditation programs for verification bodies.

This certification has been developed in compliance with the ISO 17024 standard. ISO 17024 is the global benchmark for organizations operating personnel certification programs and outlines the methods and procedures required to ensure the objective and unbiased assessment of a candidate's knowledge, skills and abilities.

Passing the PVSC examination will indicate that the candidate possesses the knowledge, skills and decision-making abilities necessary to practice the proper techniques to pre-plan, implement, configure, install, commission, troubleshoot and maintain solar PV systems.

Solar Photovoltaic Systems Certified electricians will be periodically re-assessed to ensure they remain up-to-date on technical developments and industry changes.

The CSA Group website will contain a registry of Construction Electricians certified in Solar Photovoltaic Systems installations.

Qualifications of a Solar Photovoltaic (PV) Systems Certified electrician

The Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems certification tests each candidate's knowledge to ensure the candidate possesses the knowledge and skills of the Solar PV Systems Certified electrician known as the minimally qualified candidate (MQC). CSA's expert committee defines the minimally qualified candidate as follows:

The MQC can perform installation and maintenance activities without assistance, including (but not limited to):

1. Understand the latest installation methods and technologies;
2. Read, understand and apply standards, codes and manufacturer's instructions, and
3. Utilize the appropriate materials, methods and select use and maintain tools required for the proper installation of Solar Photovoltaic Systems;
4. Understand construction documentation including drawings and written specifications;
5. Understand and apply the latest construction and building technologies;
6. Utilize the tools of the trade;
7. Read, understand and apply manufacturer's instructions;
8. Read, understand and apply the appropriate standard as well as industry best practices and building science concepts;
9. Show competency in basic worksite Occupational Health and Safety Requirements; and
10. Basic communication skills

Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified

Certification Prerequisites

To apply to take the Solar Photovoltaic (PV) Systems Certified exam for certification, candidates must satisfy the following prerequisites:

1. Construction Electrician (NOC 7241) Certificate of Qualification

AND

2. Completion of a recognized Solar PV specific training program consisting of in class and a practical (hands-on) component

Please note: all information including references provided to CSA Group as part of the application process will remain confidential.

Training Resources

Solar Photovoltaic (PV) Systems courses are available through a number of community colleges and training organizations throughout Canada, full and part-time in-class and via distance education. Courses are also available through professional associations and may be available through private colleges or other training providers. CSA Group does not endorse any organization.

Please refer to the CSA website for additional information on training providers.

Certification Process

Application Process

To become in Solar Photovoltaic (PV) Systems Certified electrician an applicant must:

1. Submit a signed application form, documenting the required education and/or experience on the application form;
2. Meet all prerequisites of the certification;
3. Sign and adhere to the professional code of ethics;
4. Submit all required fees; and
5. Pass a computer-based or written exam.

All application fees are due when submitting the application.

An e-mail address must be included as this will be the primary mode of communication regarding the steps in the certification process.

CSA Group will process applications in the order received. If an application is incomplete, CSA Group will notify the applicant via e-mail of the deficiencies found in the application. Those deficiencies must be corrected before the candidate will be approved to take the certification exam.

All applicants will receive a confirmation e-mail regarding their registration and certification eligibility requirements.

Each new application has a life span of six (6) months from the time it is received. The applicant must fulfill all requirements of the certification process within that time period. If an applicant is unable to complete the certification process within that period of time, the application will expire and the applicant must restart the certification process including payment of any application or examination fees.

The certification application is provided at the end of this document.

Program Fees

Initial Application Fee (non-refundable)	\$ 95.00 CAD
Examination and Certification Fee	\$ 250.00 CAD
Re-examination Fee	\$ 95.00 CAD
Exam Re-schedule Fee	\$ 90.00 CAD
Re-certification Fee (application and exam)	\$ 345.00 CAD

Payment and Refund Policy

Payment of the fees must be submitted with the completed and signed application. All fees shall be submitted in Canadian funds. CSA Group accepts checks, Visa, MasterCard and American Express as payment.

When the payment has been received and the application is processed, notification will be sent regarding the next steps:

- Request for additional information
- Application audit (if selected)
- Exam scheduling notification

Application fees are non-refundable.

Exam fees may be partially refunded if a written request is submitted at least one month prior to a scheduled exam date and at least one month prior to the examination eligibility expiration date. CSA Group will retain the application fee **and** a processing fee of \$95 CAD funds.

Certification Process

Audit Process

The submission of an application indicates the applicant's agreement to comply with the terms of CSA Groups' audit process. All applications are subject to an audit and a percentage of applications are randomly selected for audit. Please note that while the selection process for an audit is primarily random, CSA Group reserves the right to select any applicant to be audited at any time, including after the credential has been awarded. If the applicant fails to meet the audit requirements after attaining the credential, the applicant is not entitled to a refund.

The applicant will be notified when the application and fee is received if the submitted application is selected for audit. An audit notification will be sent to the applicant electronically and will provide detailed information on how to comply with the terms of the audit. During an audit, the applicant will be asked to submit supporting documentation required by the certification requested that may include, but is not limited to, the following:

- Copies of diploma or a global equivalent;
- Signatures from supervisor(s) or manager(s) for the skills, experience and/or responsibilities if required and documented in the experience section of the application and on the performance checklist;
- Copies of certificates and/or letters from the training institution(s) for any mandatory course if documented on the application;
- Copies of certificates and/or letters to demonstrate the required amount of professional development; and
- Other items required by the credential applied for.

Once documentation is provided, the audit should take approximately two weeks to complete. The applicant may not continue with the certification process until complying with the audit requirements.

Once the applicant has successfully completed the audit, the applicant will be permitted to continue the certification process and will be notified of his/her examination eligibility. If the applicant fails to meet the audit requirements, a refund may be given, dependent upon the stage of the certification process at the time of the audit. (Refer to the Payment and Refund Policy section of this handbook for more details).

Examination Administration and Scheduling

The Construction Electrician (NOC 7241) - Solar (PV) Systems Certified certification examination is administered through CSA Groups' test vendor at test sites located throughout North America. Once a candidate has submitted all the required information and has been approved to take the certification exam, CSA Group will send the candidate approval to exam and scheduling information to by email. Once the candidate receives their email notifications they will be able to register for the exam at the test site/date they choose. Applicants should save all examination scheduling verifications for their records. Testing sites are normally within a short driving distance from most candidates.

CSA Group uses computer-based testing (CBT) to deliver its certification examinations. However, in certain situations, paper-based tests may be offered following specific industry events or following selected training courses when a certified exam proctor is available. Please contact CSA Group for paper-based test delivery. CSA Group reserves the right to cancel a scheduled paper-based test in the event that there are fewer than 10 candidates registered.

Examination Eligibility

The examination eligibility period is six (6) months from the time an application is received. Applicants may take the examination up to three times within the six month period if they did not pass on the first attempt. (As noted below, re-examination fees apply to the second and third attempts to pass the examination.)

Re-examination

Each applicant is granted a six month eligibility period in which to pass the examination. During the eligibility period, an applicant may take the examination up to three times.

Certification Process

Re-examination fees apply to the second and third attempts to pass the examination, and re-examination fees must be paid in full in order to schedule an exam. If the eligibility period expires without achieving a passing score, the applicant must reapply for the certification.

Examination Language

The CSA Group certification examination for Construction Electrician (NOC 7241) - Solar Photovoltaic Systems Certified is administered in English and French.

Examination Special Accommodation

The administration of the exam may be modified to accommodate special needs at the request of the candidate. Please submit supporting documentation with the completed application.

Certificate Issuance

Each Construction Electrician (NOC 7241) - Solar (PV) Systems Certified will be issued a certificate indicating the valid timeframe of the certification.

Replacement of Certificates

CSA Group may issue a replacement certificate if your certificate has been lost or destroyed, or if the Certified individual's name has changed, and the original certificate is returned to the director. A replacement fee will be charged.

Certification Period

CSA Groups' Solar Photovoltaic (PV) Systems Installer certification is valid for a period of 5 years. Certified Solar Photovoltaic (PV) Systems Installers are required to submit all required fees during the certification period.

Use and Requirements for Use of Certificates and Logos/Marks

Once an individual receives his/her certification letter and certificate the individual may represent themselves as Solar Photovoltaic (PV) Systems Certified under CSA Groups' Construction Electrician (NOC 7241) - Solar Photovoltaic (PV) Systems Certified Personnel Certification Program.

Certification under this program does not authorize the certified individual any rights to the use of CSA Groups' name or logo (mark). All requests for use of the mark must be made in writing and expressly authorized by CSA Group. As part of the program monitoring, CSA Group routinely reviews advertisements, catalogs, websites and promotional material to confirm compliance. Unauthorized use of the CSA Group mark constitutes cause to initiate procedures for withdrawal of certification and in severe cases may constitute grounds for legal action.

Professional Code of Ethics

Construction Electricians (NOC 7241) - Solar Photovoltaic (PV) Systems Certified require firm adherence to a professional code of ethics. Applicants must review and sign the Code of Ethics when applying to CSA Group for certification. A copy of the Code of Ethics is included in this handbook with the certification application.

Non-Discrimination

Participation in CSA Groups' personnel certification programs is open on a non-discriminatory basis to all individuals and does not require membership in any association.

Certification Process

Confidentiality

CSA Group will maintain confidential information received from the individual and will not disclose such information to any third party without prior written approval by the individual; except in response to a subpoena, court order or other compulsory process. CSA Group will provide written notification to the individual at least five (5) business days prior to releasing such information.

Certification Renewal

Construction Electrician (NOC 7241) – Solar Photovoltaic (PV) Systems Certified certifications expire every five years. Generally, CSA Group will issue a renewal notice and application form 90 days prior to the date when the certification expires. Certified individuals, who apply for renewal, meet the renewal qualifications, and pay the required fee will receive a new certificate containing the new expiry date.

Recertification Requirements

Construction Electricians (NOC 7241) – Solar Photovoltaic (PV) Systems Certified may apply for recertification up to 6 months prior to their certification expiration. Construction Electricians (NOC 7241) – Solar Photovoltaic (PV) Systems Certified applying for certification more than 3 months after expiration of their certification must fulfill all requirements of the initial certification process.

A certified Construction Electrician (NOC 7241) – Solar Photovoltaic (PV) Systems Certified may recertify by successfully challenging the Construction Electrician (NOC 7241) – Solar Photovoltaic (PV) Systems Certified certification examination.

Refusal to Issue or Renew a Certification

CSA Group may refuse to issue or renew a certified individual's certificate:

1. For any of the circumstances under which CSA Group can revoke or suspend a certificate; or
2. The certificate to be renewed was revoked or suspended by CSA Group.

Revocation or Suspension of a Certification

CSA Group reserves the right to withdraw the certification of any person violating the policies and procedures of the certification process.

CSA Group may revoke or suspend a Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified certification for any of the following reasons:

1. The application was fraudulent or contained inaccurate information;
2. The person was discharged from his/her employment for incompetence, unless the person has not yet exhausted the rights of appeal available in his/her organization;
3. The person has previously had a Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified Certification revoked; or
4. The person has failed:
 - a. To exercise the level of care, diligence and skill that a reasonably prudent technician would be expected to exercise in a similar situation;
 - b. To act honestly, competently and with integrity; or
 - c. To meet or has contravened any condition that is set out in his or her certificate.

Upon a notice of termination of a Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified certification, the individual will immediately terminate the use of CSA Groups' certification mark, if permission for use of the mark had been granted. Additionally, the individual will cease all use of or reference to the CSA Group certification and the Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified designation. Individuals have the right to appeal as outlined in the appeals process below.

Certification Process

Voluntary Withdrawal of Certification

Individuals wishing withdrawal of the Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified Certification must submit a request in writing to CSA Group. Once approved, the individual will be removed from the National Registry and must immediately cease any use of or reference to the CSA Group certification.

Individuals wishing to reinstate their certification must apply for certification as outlined in the certification process.

Examination Security

All CSA Group certification examination content and wording of examination questions constitute confidential information protected by copyright law. Any unauthorized receipt, possession, or transmission of CSA Group examination questions, content, or materials, either before the examination, on-site, or in the future is strictly forbidden.

The use of CSA Group examination materials for the purpose of examination preparation or training is also forbidden.

CSA Group reserves the right to take whatever measures are necessary to protect the integrity of its examinations. Violation of the CSA Group examination agreement and/or non-disclosure agreement, or the giving or receiving of aid in any CSA Group examination as evidenced either by observation at the time of the examination or by statistical analysis, or engaging in other conduct that subverts or attempts to subvert the examination or the CSA Group certification process, is sufficient cause for CSA to:

- Bar an individual from the examination
- Terminate participation in the examination
- Withhold and/or invalidate the results of the examination
- Withhold a certification
- Revoke a certification or
- Take appropriate other action

Appeals, Complaints, and Disputes

CSA Groups' certification programs are administered and supervised by the U.S. division, CSA America, Inc., in Cleveland Ohio. All challenges to the certification program are governed by CSA Groups' Appeals and Complaint Procedures.

Any individual shall have the right to appeal all decisions relating to CSA Groups' personnel certification program including, but not limited to: testing, denial or termination of certification. A written notice of intent to appeal shall be sent to CSA Group within five (5) business days of the individual's receipt of the decision, which forms the basis for appeal.

CSA Group shall arrange an appeal meeting with the individual at CSA Groups' headquarters or other mutually agreed to location, within ten (10) business days of the receipt of the written request to appeal. The individual and a CSA Group representative, who was not involved in the original decision causing the appeal, will attend and participate in the meeting. At this meeting, the individual may not be represented by counsel unless CSA Group has been notified at least five (5) business days prior to the meeting. CSA Group shall provide its decision within five (5) business days after the meeting has taken place.

If the individual still disputes the decision made by CSA Group after the appeal meeting, the individual has the right to appeal to an independent and impartial Appeals Board as outlined below.

Appeals Board

Upon receipt of a written intent by the individual to appeal to the Appeals Board, CSA Group shall arrange the Appeals Board hearing within ten (10) business days of the receipt of the request and notify the individual and responding parties. The individual may be represented by counsel at this meeting.

Certification Process

No individual or agent thereof, nor any person with any interest, directly or indirectly, in such individual, shall serve on the Appeals Board.

The Appeals Board hearing shall be informal and private. The individual shall be given a full opportunity to present any material or proofs relevant to the issue. Formal rules of evidence shall not be applicable. The Appeals Board shall determine the relevance and materiality of any evidence presented.

When the individual has had a full opportunity to submit their case, the Appeals Board may declare the hearing closed and shall provide the individual and CSA Group with a decision, including a brief description of its reasons, within ten (10) business days. Decisions of the Appeals Board shall be by majority vote.

All costs related to the Appeals Board are the responsibility of the individual and are due within ten (10) business days of the billing, unless the Appeals Board sides with the individual's position, in which case CSA Group will be responsible for the costs.

Examination Preparation and Completion

General Description

The Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified certification exam consists of approximately 80 multiple-choice questions. Examination questions have only one correct answer. Each exam question is independent and does not rely on the correct answer to any other questions.

CSA Group may include an additional 10 questions in the exam for statistical evaluation of future use. These additional questions are not included as part of the examination score. These questions will not be identified in the exam, so it is important that the candidate answer every question completely. The candidate's grade is based on the number of scored items answered correctly.

The candidate will have two hours (120 minutes) to complete the exam. Exams are closed book. No reference materials may be used during the course of the exam.

Exam Content

The exam is based on categories of tasks and knowledge required by a Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems. The list below outlines the examination content by category for the Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified Certification.

Categories

- Solar Photovoltaic (PV) Systems Safety
- Solar Photovoltaic (PV) Pre-Installation On-Site Review
- Solar Photovoltaic (PV) Systems Installation
- Solar Photovoltaic (PV) Systems Troubleshooting and Maintenance

Pass-Fail Standard

CSA Groups' Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified certification examination passing standard is established utilizing standard psychometric guidelines and is determined using a criterion-reference technique. A criterion-referencing score judges a candidate based on a predetermined standard of knowledge or skill. This predetermined standard is defined as the minimum score that would be expected from candidates who have the level of knowledge and skills needed to competently conduct their work responsibilities.

Exam Delivery

The Construction Electrician (NOC 7241)-Solar Photovoltaic (PV) Systems Certified certification exam will be delivered electronically at our computer-based testing center locations on demand, or as a written (paper and pencil) exam during scheduled exam sessions. For the paper and pencil exams, all answers will be recorded on the provided exam answer sheet using a No. 2 pencil. No marks may be made in the exam booklet.

Examination General Instructions

During the exam, the proctor will be responsible for supervising the exam in such a way as to ensure that exam security is maintained. As such, all candidates are expected to adhere to the following guidelines during the test sessions.

A candidate's participation in any irregularities occurring during the examination, such as giving or obtaining unauthorized information or aid, as evidenced by an observation or subsequent statistical analysis, may be sufficient cause to terminate participation, invalidate the results of the examination, or other appropriate remedy.

Examination Preparation and Completion

To be admitted to the examination the candidate must:

- Submit their confirmation notice to the proctor.
- Bring current photo identification with signature (driver's license, immigration card, passport, etc.). The candidate will NOT be admitted without proper identification. If there are any questions concerning the type of picture ID, the candidate should contact CSA Group.
- Report on time.

During the Exam:

- Smoking is NOT permitted in the examination site.
- Food and beverages are NOT allowed in the examination area.
- All personal items including books, notebooks, other papers, all electronic equipment (i.e. cell phones, cameras, etc.), book bags, coats, etc. will NOT be allowed in the exam room and must be left outside of the exam room AT YOUR OWN RISK.
- Friends and relatives, including children, will NOT be allowed in the examination building.
- Computer-based testing facilities offer exam services to multiple agencies. There may be other individuals in the testing room with the candidate who are sitting for exams from different organizations. The rules for their exam may be slightly different than the rules for the CSA candidate's exam in terms of exam time, and what is and is not allowed at their station.
- Computer-based tests are delivered via secure Internet connections. Internet connections are subject to the local Internet providers in the area. While it is not the norm, Internet connections can, on occasion, be lost momentarily, requiring the proctor to log the candidate back into his/her examination. If this occurs, the candidate should inform the proctor that the connection has been lost and the proctor will assist the candidate in logging back into the exam. The exam time remaining will be exactly the same as it was when the Internet connection was lost.

Prohibited Items:

Candidates are expressly prohibited from bringing the following items into the exam room:

- cameras, cell phones, optical readers, or other electronic devices that include the ability to photograph, photocopy or otherwise copy test materials
- notes, books, dictionaries or language dictionaries
- book bags or luggage
- ipods, mp3 players, headphones, or pagers
- calculators (except as expressly permitted by the test sponsor), computers, PDAs, or other electronic devices with one or more memories
- personal writing utensils (i.e., pencils, pens, and highlighters)
- watches
- food and beverage
- hats, hoods, or other headgear

If the proctor determines that the candidate has brought any such items to the test site, the items may be demanded and held by testing center staff. Test center reserves the right to review the memory of any electronic device to determine whether any test materials have been photographed or otherwise copied. If the review determines that any test materials are in the memory of any such device, the test center reserves the right to delete such materials and/or retain them for subsequent disciplinary action. Upon completion of the review and any applicable deletions, the test center will return the device to the candidate, but will not be responsible for the deletion of any materials that may result from our review, whether or not such materials are test materials. By bringing any such device into the test site in contravention of our policies, the candidate expressly waives any confidentiality or other similar rights with respect to the candidate's device, our review of the memory of the candidate's device and/or the deletion of any materials. The test vendor, the examination site, and the test administration staff are not liable for lost or damaged items brought to the examination site.

Examination Preparation and Completion

Environment

Examination room temperature can be unpredictable; therefore, we suggest that the candidate bring appropriate clothing (e.g. sweater or sweatshirt without pockets) to help to adapt to a cooler or warmer climate in the examination room. The candidate should bring ear plugs if he/she is sensitive to noise.

Exam Security

All content, specifically questions and answers are the proprietary and confidential property of CSA Group. They may not be copied, reproduced, modified, published, transmitted, or distributed in any manner without the express written authorization of CSA Group. Candidates must take no action to compromise the integrity or confidential nature of the exam and its contents.

Exam Results Notification

Approximately two weeks after completion of the exam, the candidate will receive official notification of the exam score from CSA Group. Candidates passing the exam and fulfilling all program requirements will also receive a certificate with the effective date of certification. In order to protect the candidate's confidentiality, under no circumstances will test scores be given by telephone.

Examination Body of Knowledge and Blueprint

Examination Knowledge Reference Documents

The Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems certification exam draws on concepts included in the following standards and materials. They are helpful reference materials to use in preparation for the exam:

Familiarity with solar photovoltaic (PV) standards including, but not limited to:

- **Canadian Electrical Code – Part 1**
- **Solar Thermal Standards:**
 - CAN/CSA-F378-87 (R2004) – Solar Collectors
 - CAN/CSA-F379 Series-09 – Packaged Solar Domestic Hot Water Systems (Liquid-to-liquid heat transfer)
 - CAN/CSA-F383-08 – Installation of Packaged Solar Domestic Hot Water Systems
- **Solar Photovoltaic Standards:**
 - CAN/CSA-F382-M89 (R2009) – Characterization of Storage Batteries for Photovoltaic Systems
 - CAN/CSA-C61215-08 – Crystalline Silicon Terrestrial Photovoltaic (PV) Modules Design Qualification and Type Approval
 - CAN/CSA-C61646-10 – Thin-film Terrestrial Photovoltaic (PV) Modules – Design Qualification and Type Approval
- **Other Standards Related to Solar Photovoltaic Technologies:**
 - C22.1-09 – Canadian Electrical Code - Section 50 – Solar Photovoltaic Systems
 - C22.2 No. 107.1-01 – General Use Power Supplies (Specifically Clause 10 – Inverters for Photovoltaics)
 - C22.2 No. 257-06 – Interconnecting Inverter-based Micro-distributed Resources to Distribution Systems
 - C22.2 No. 271 – Photovoltaic Cables (Under Development)
 - CAN/CSA-C22.3 No. 9-08 – Interconnection of Distributed Resources and Electricity Supply Systems

Exam Objectives

The following exam objectives were developed by a group of industry experts. The weighting of each objective was determined through industry survey. The following table outlines the knowledge and skills required for each objective.

1	Solar Photovoltaic (PV) Systems Safety		23%
	1.01	Complies with legal requirements (e.g., code), standards and project-specific policies and procedures applicable to Solar PV Systems	
2	Solar Photovoltaic (PV) Pre-Installation On-Site Review		17%
	2.01	Interprets design documents	
	2.02	Reviews site-specific installation documents	
	2.03	Develops implementation strategy	
3	Solar Photovoltaic (PV) Systems Installation		49%
	3.01	Verifies site conditions with reference to design documents	
	3.02	Installs modules and arrays	
	3.03	Installs inverters	
	3.04	Installs bonding, grounding, surge and lightning protection	
	3.05	Installs electrical protection and controls (e.g. disconnects overcurrent protection, combiner boxes.)	
	3.06	Installs utility metering equipment	
	3.07	Connects to distribution systems	
	3.08	Installs batteries and charge controllers	
	3.09	Installs energy monitoring and control systems	
	3.10	Coordinates inspection with authority having jurisdiction	
	3.11	Commissions PV systems	
4	Solar Photovoltaic (PV) Systems Troubleshooting and Maintenance		13%
	4.01	Monitors system performance	
	4.02	Troubleshoot PV system problems	
	4.03	Maintains PV Systems	
	4.04	Decommission PV System for Repair	

For internal use only

Received:

Entered:

Initials:



Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems Personnel Certification Application Form

PLEASE PRINT CLEARLY
**Incomplete information will result
in processing delays**

For Questions or Comments, please contact:
Personnel Certification Coordinator
Phone: 877-235-9791 x 88493, or
training@csagroup.org

Return Form by:

E-mail: training@csagroup.org

Fax: 877-539-7613 Attention: Personnel Certification

Mail: CSA group
Personnel Certification Program
8501 East Pleasant Valley Rd.
Cleveland, OH 44131 - 5575 USA

Salutation: First Name: MI: Last Name:

PROFESSIONAL / BUSINESS INFORMATION

Organization: Job Title:
 Mailing Address: City/Prov/Postal Code:
 Phone No: Mobile No:
 E-Mail Address (REQUIRED):

HOME ADDRESS

Mailing Address: City/Prov/Postal Code:
 Phone No: Alt. E-mail:

Correspondence should be sent to (SELECT ONE): Business Address Home Address

PERMISSION TO PUBLISH INFORMATION on the CSA online Directory of Certified Personnel (PLEASE SELECT ONE)

- PUBLISH** Please PUBLISH my professional contact information with my name and certification information on the CSA Group national online Registry of Certified Personnel. By checking this option, I grant CSA Group permission to list my name, certification number, company, business address, business phone and preferred e-mail.
- DO NOT PUBLISH** Please DO NOT PUBLISH my contact information. By checking this option, I grant CSA Group permission to list only my name, certification number, city and province.

**Certification is contingent upon meeting all program pre-requisites AND successful completion of the
CSA Standards Solar Photovoltaic (PV) System Installation Certification Examination.**



THE FOLLOWING REQUIREMENTS MUST BE MET PRIOR TO TAKING THE CSA EXAM

<input type="checkbox"/> Requirement 1: Construction Electrician (NOC 7241) Certification of Qualification		
Issued To:	Effective Date:	Certificate Number:

<input type="checkbox"/> Requirement 2: Completion of a recognized solar PV specific training program consisting of in-class and a practical (hands-on) component.			
Full Name of College/University/Other	Program Name	Course Date(s)	Practicum (Enter # of hours, if applicable)

<input type="checkbox"/> Requirement 3: Attach copies of your CQ and Training Certificate to your completed application.
<input type="checkbox"/> Attach Copy of Construction Electrician (NOC 7241) Certification of Qualification <input type="checkbox"/> Attach Copy of Solar PV Training Certificate of Completion If you are electronically submitting this application, an email box will open with the form when you hit the "Submit by Email" button at the the top of Page 1. At that time you will be able to attach the electronic copies of the CQ and training certificate required to accompany the application.

ALL CSA CERTIFICATION EXAMINATIONS ARE DELIVERED AT COMPUTER BASED TESTING CENTERS unless a paper-based exam session has been scheduled. If you are applying and have already arranged to attend a pre-scheduled paper-based exam, please provide the information below.			
Examination Option (SELECT ONE)			
	Date	Time	Location
<input checked="" type="checkbox"/> Computer Based Examination	Candidate selected	Candidate Selected	Candidate Selected
<input type="checkbox"/> Paper Based Examination (Sessions are pre-scheduled)	<u>Session Date</u>	<u>Session Time</u>	<u>Session Location</u>



**Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems
Personnel Certification Application Form**

Program Fees

Application Fee (non-refundable):	\$ 95.00
Examination and Certification Fee:	\$250.00
Total Fees Due:	<u>\$345.00</u>

Application and examination fees are due at the time of application. If the candidate does not meet the prerequisites of the certification, CSA Group will refund the examination fee.

Payment Method

Payment Type :	<input type="text"/>
Credit Card Number	<input type="text"/>
Name on Credit Card:	<input type="text"/>
Expiration Date (mm/yyyy):	<input type="text"/>
Billing Address:	<input type="text"/>
Billing City/Province/ Postal Code:	<input type="text"/>

All fees are in Canadian (CAD) funds. Please make cheques and money orders payable to: CSA Group. Applications received without payment cannot be processed.

For internal use only	
Customer #	Company Customer #
Sales doc #	Delivery doc #
Invoice #	



Construction Electrician (NOC 7241) Solar Photovoltaic (PV) Systems Personnel Certification Application Form

Code of Ethics and Professional Conduct

This code of ethics sets forth the expectation that credential holders will commit to conducting themselves in a professional, honest and impartial manner. This code of ethics applies to all CSA Group Personnel Certification credential holders regardless of the certification designation, and includes the following professional conduct:

1. Provide equitable, honest and impartial treatment of customers;
2. Provide customers with accurate, objective, timely and understandable information;
3. Perform all services in a safe and professional manner;
4. Stay informed of and comply with all relevant laws, codes, regulations, standards and industry practices;
5. Protect proprietary and confidential information gained during the course of work; and
6. Promote positive activities which raise the level of professionalism of the industry.

Certification Terms and Conditions

1. I agree to notify CSA Group in a timely manner of changes concerning the information I have provided, including my current address, telephone number, and e-mail.
2. I have reported, and will continue to report, to CSA Group, within sixty (60) days of occurrence, any matters, proceedings, lawsuits, settlements and/or other agreements, administrative agency actions, or organizational actions relating to my profession or occupation, including all complaints relating to my professional activities, and matters or proceedings involving, but not limited to certification, credentialing, malpractice, disciplinary ethics or similar matters. I also agree to promptly report, within sixty (60) days of occurrence, any felony criminal charges, convictions, or plea agreements or other criminal charges, convictions, or plea agreements relating to acts of dishonesty or unethical conduct.
3. I agree that CSA Group has the right to communicate with any person, government agency or organization to review or confirm the information in this application or any other information related to my application for CSA Group certification. Further, I agree to and authorize the release of any information requested by CSA Group for such review and confirmation.
4. I understand that the CSA Group credential status does not imply licensure, registration or government authorization to practice any specific job function or to engage in related activities.
5. I agree that all materials submitted to CSA Group become the property of CSA Group, and that CSA Group is not required to return any of these materials to me.
6. I agree that upon achieving the CSA Group credential, my name may be posted on the CSA Group website as part of an Online Registry to be created and maintained by CSA Group.
7. I agree that all disputes relating in any way to my application for a CSA Group certification and/or my involvement generally in a CSA Group certification program, will be resolved solely and exclusively by means of CSA Group policies, procedures and rules, including the stated appeals process.
8. CSA Standards reserves the right to suspend or revoke my credential if it is determined I have failed to uphold, or otherwise breached this Agreement, or committed a violation of the CSA Group Code of Ethics and Professional conduct.
9. I release and indemnify CSA Group from all liability and claims that may arise out of, or be related to, my certification and related activities.

The Certification Application/Renewal Agreement may be revised periodically. I understand that it is my responsibility to obtain the most current copy online at: <http://www.csagroup.org>

Application and Privacy Policy

I agree not to discuss or release in any form the contents of the exam. I affirm that all information provided in this application is correct. I agree to allow my name and certification information (and professional information if authorized above) to be posted on the CSA Group website as part of the online registry of certified personnel. CSA Group is committed to respecting the privacy of its members, customers, and other stakeholders with whom we interact in the development and delivery of products and services. CSA Group does not sell or share your contact information with other organizations for commercial purposes. I agree with this Privacy Statement and consent to CSA Group sending me from time to time information about other CSA products and services for which it believes I may have an interest.

As a CSA Group Personnel Certification credential holder, I agree to conduct myself in a professional and thorough manner. I agree to the Terms and Conditions of my certification including adherence to the Code of Ethics and Professional Conduct and I agree to adhere to the Application and Privacy Policy set forth by CSA Group.

Signature:

Date: