National Association of Elevator Contractors

CET EDUCATION

Program Guide

Updated 7/1/2025

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NAEC'S CET EDUCATION PROGRAM

The Certified Elevator Technician (CET) Education Program is sponsored and administered by the National Association of Elevator Contractors (NAEC). The purpose of the CET Education Program is to provide the elevator industry technical, mechanical, construction, and maintenance workforces with a means of obtaining and verifying critical education and training requirements related to compliance with industry codes, elevator and escalator specific technical theory, components, and competencies. It is a program which spans four years and 12 courses of study. The program consists of two levels, the core curriculum (Courses 1-4) and the advanced curriculum (Courses 5- 12). In addition to unit exams given during the coursework, an exam will be given at the completion of each level. Each course will include skills verifications related to the coursework. The skills must be completed in the presence of a CET or CET-S before going onto the next course.

The CET Education Program is the nationally recognized training program included in NAEC's National Guidelines for Apprenticeship Standards (C2011-03) approved by the U.S. Department of Labor Office of Apprenticeship.

All CET Education course materials are available from Elevator World, Inc.
To purchase course material, call 251.479.4514 x 119. Purchasers will need to provide their candidate number assigned to each CET candidate.

Program information may be obtained from the NAEC website at www.naec.org, or by calling 800.900.6232 or 770.760.9660.

Program Definitions

- **Candidate** is a participant/learner in the CET Education Program; an individual who has met all application requirements of the NAEC CET Education Program and has been accepted into the program.
- **AET™** is an Associate Elevator Technician; an individual who has met all application requirements of the CET Education Program, has successfully completed all course requirements of the program's core curriculum, completed all the related skills verifications, completed the required on-the-job-training (OJT) hours and has passed the required qualifying examination.
- **CET** is a Certified Elevator Technician who has met all the application requirements of the NAEC CET Certification Program, passed the required certification exam and has maintained their certification by completing all requirements of the annual renewal process. A current CET will hold a CET ID issued by the NAEC Certification Board.
- **MC** is a Modernization and Construction designation awarded to individuals who have met all the application requirements of the CET Education Program; has successfully completed all course requirements of the program's core and advanced curriculum including all required exams and has completed the skills verifications for Courses 1, 2, 4, 5, 6, 7, 8, 9.
- **MR** is a Maintenance and Repair designation awarded to individuals who have met all of the application requirements of the CET Education Program; has successfully completed all course requirements of the program's core and advanced curriculum including all required exams and has completed the skills verifications for Courses 1, 3, 4, 5, 6, 8, 9, 10.
- **E** is a Escalator designation awarded to individuals who have met all of the application requirements of the CET Education Program; has successfully completed all course requirements of the program's core and advanced curriculum including all required exams and has completed the skills verifications for Courses 1, 4, 5, 6, 8, 9, 11 and has passed the required qualifying examination.
- **CET-S** is a CET supervisor/administrator; an individual who is a CET (see definition above) and who has successfully completed the NAEC CET Supervisor Training Course. Each participating candidate must have access to a CET-S.
- Program Administrator is an individual who has met the requirements and may proctor unit exams.

Education Program Outline

Candidate Application Process

- CET Candidate Qualifications**:**
  - Must have a high school diploma, GED or equivalent;
  - Must be at least 18 years of age;
  - Must have access to the supervision of a CET-S;
  - Must pay the application fee and annual candidate administration fee;
  - Must be able to read and write in English;
  - Must be a citizen of the United States or be legally authorized by the United States government to work and participate in a training program. The exception to this requirement is for individuals living outside the United States and not working in the United States.

  - Youth Apprenticeship/Educational Program Qualifications:
  - Must be enrolled in a high school or vocational school;
  - Must attend an NAEC approved training center, state, or county approved vocational school for the related instruction with supervised job site training by member company;
  - Must be at least 16 years of age;
  - Must have a notarized wavier from a parent or guardian;
  - Must have access to the supervision of a CET-S;
  - Each individual must be approved by NAEC;
  - Candidate ID number issued when approved by NAEC for purchase of course material;
  - Each individual must purchase their own course material; Course material cannot be shared;
  - Must pay the application fee and annual candidate administration fee;
  - Must be able to read and write in English;
  - Must be a citizen of the United States or be legally authorized by the United States government to work and participate in a training program;
  - Individuals must adhere to the Youth Apprenticeship guidelines for your state;
  - Individual cannot move forward to advanced curriculum until OJT hours are met.

All must complete the following:

- Complete and submit online application at www.naec.org.
- NAEC will return your application for review and signature.
- Return the following documents to NAEC:
  - Application signed by candidate and authorized representative of employer;
  - Copy of High School Diploma or GED transcript *(Not required for Youth Apprentice);*
  - Copy of photo ID that includes date of birth;
  - Certification Statement signed by candidate, CET-S and authorized representative of employer;
  - Code of Ethics signed by candidate;
  - Application fee of $250 for NAEC members or $75130 for non-members

ADA Accommodations: Request Special Testing Accommodation Form available on website. Applicants with disabilities covered by the Americans with Disabilities Act (or Canadian/Australian equivalent) must have appropriate licensed professional complete Documentation of Disability-Related Needs. ADA accommodations request to be reviewed by the Education Committee.

Using an interpreter for the exams will be permitted, but the individual would need to specialize in the field as an interpreter. Will need to provide job description, provide details, such as company, title and provide to NAEC for approval before testing. They must not have any affiliation with the elevator industry to prevent any possible assistance in instruction to answer the question.

Core Curriculum (Courses 1-4)

- Consists of 4 courses:
  - Course 1: Introduction to Elevators consisting of 3 units (OSHA 10 or 30 required for completion of course 1).
  - Course 2: Basics of Installing Elevator Components consisting of 4 units
  - Course 3: Maintenance Practices and Testing consisting of 4 units
  - Course 4: Electrical Safety and Theory
- Courses must be completed in order;
- Approximately 2 years to complete; 321 total classroom hours;
- Course units consist of three basic parts:
  - Text based workbook.
  - On the job skills verification.
  - Unit exams (minimum passing score 75%).
- On the job skills must be completed in the presence of a CET or CET-S.
- Upon completion of each unit or course an exam will be given. The exam will be
  - Online.
  - Closed book.
  - Questions chosen from study questions at the end of each unit/course chapter of the core curriculum.
  - Proctored by the candidate's CET-S and carried out in accordance with NAEC testing guidelines.
  - **Unit exams may also be proctored by a Program Administrator or can be taken through Remote Proctoring.**
  - Carried out in accordance with NAEC testing guidelines.
- Curriculum must be purchased from the approved NAEC vendor, Elevator World, Inc., by calling251-479-4514 x 119 providing the candidate number assigned upon approval of program application.

AET Designation

An individual will be awarded the Associate Elevator Technician (AET) designation based on the following criteria:

- Has met all of the application requirements of the NAEC CET Educational Program;
- Has successfully completed all course requirements of CET Educational Program's core curriculum (Course 1-4);
- Has documented at least 4,000 hours of on-the-job training from hire date to present;
- Has completed the required skills verifications of the core curriculum (Course 1-4); and
- Has passed the Level 1 (AET) exam.

The Level 1 –(AET) Exam will be:

- Online;
- Closed book;
- Questions randomly chosen from study questions in the core curriculum (Courses 1-4);
- Proctored by the candidate's CET-S and a competent adult who is not the supervisor or related to the candidate in accordance with proctoring guidelines; or can be taken through Remote Proctoring. Carried out in accordance with NAEC testing guidelines.

Minimum passing score for Level 1 Exam is 75%. If the applicant fails the Level 1 Exam, the following process will be applicable:

- After the 1st Time – The candidate may retake the examination (2nd attempt) after a 15-day waiting period,
- After Failing the 2nd Time – The candidate may retake the examination (3rd attempt) after a 15-day waiting period and paying a $100 fee,
- After Failing the 3rd Time – The candidate may retake the examination (4th attempt) after a 60-day waiting period and pay a $100 fee. Additionally, the candidate's CET-S, and an officer of the candidate's company, must submit a signed and dated statement certifying that the candidate studied the respective curriculum chapter(s) that the candidate failed.
- After Failing the 4th Time – The candidate must repeat the entire Core Curriculum.

Entering the Education Program at the AET Designation

An individual may enter the CET Program as an AET and begin studies at the Advanced Curriculum based on the following steps and approval by the NAEC Education Committee:

1. Completion of the NAEC CET Education program online application; to include a notarized letter written by applicant stating experience; letter from current employer stating job responsibilities; copies of W2s and pay an additional $100 to current application fee.
2. Completion of:
   - industry related educational training program (NEIEP) modules/courses that are substantially equal to or more comprehensive than the core curriculum of the NAEC CET Educational Program.
   - **o**r
   - at least 6,000 hours of on-the-job industry training; (copies of 3 years W2s).
   - **or**
   - at least 8,000 hours of on-the-job training related to the industry; (copies of 4 years W2s)
3. Completion of the OSHA 30 course.
4. Completion of the Level 1 (AET) Exam with a minimum score of 75%.
5. Verifiable completion of Skills Verifications included in the CET core curriculum (Courses 1-4) to be completed before Level 2 Exam. Courses' 1-4 course material must be purchased from Elevator World once the individual has been approved by the Education Committee.

This option will not be available to any individual currently enrolled or has ever been enrolled into the CET Program.

Approved individuals are required to purchase years 1 & 2 of the CET curriculum.

Minimum passing score for Level 1 Exam is 75%. If the applicant fails the Level 1 Exam, the following process will be applicable:

- After the 1st Time – The candidate may retake the examination (2nd attempt) after a 15-day waiting period,
- After Failing the 2nd Time – The candidate may retake the examination (3rd attempt) after a 15-day waiting period and paying a $100 fee,
- After Failing the 3rd Time – The candidate may retake the examination (4th attempt) after a 60-day waiting period and paying a $100 fee. Additionally, the candidate's CET-S, and an officer of the candidate's company, must submit a signed and dated statement certifying that the candidate studied the respective curriculum chapter(s) that the candidate failed.
- After Failing the 4th Time – The candidate must complete the entire Core Curriculum.

Advanced Curriculum (Courses 5-12)

- Consists of 8 courses:
  - Course 5: Elevator Doors and Equipment consisting of 1 unit
  - Course 6: Electric Traction Elevators: Traction Theory, Maintenance, Testing & Safety consisting of 3 parts
  - Course 7: Electrical Wiring and Equipment consisting of 1 unit
  - Course 8: Electrical Safety and Theory consisting of 1 unit
  - Course 9: Hydraulic Theory and Installation consisting of 1 unit
  - Course 10: Machinery Troubleshooting, Rope Replacement consisting of 2 units
  - Course 11: Escalators and Moving Walks consisting of 1 unit
  - Course 12: Accessibility consisting of 1 unit
- Approximately 2 years to complete; 290 total classroom hours;
- Course units consist of three basic parts:
  - Text based workbook
  - On the job skills verification
  - Unit exams (minimum passing score 75%).

- On the job skills must be completed in the presence of a CET or CET-S.
- Upon completion of each unit or course an exam will be given. The exam will be
  - Online;
  - Closed book;
  - Questions chosen from study questions at the end of each unit/course chapter of the advanced curriculum;
  - Proctored by the candidate's CET-S and carried out in accordance with NAEC testing guidelines.
    - Unit exams may also be proctored by Program Administrator
- Curriculum can be purchased from approved NAEC vendor, Elevator World, Inc., by calling 251-479-4514 x 119 using the candidate number assigned upon approval of program application.

Certificate of Completion

An individual will be awarded a Certificate of Completion for the CET Education Program and can apply for CET Certification based on the following criteria:

- Has met all of the application requirements of the NAEC CET Education Program;
- Has successfully completed all the AET requirements and has an additional 4,000 OJT hours from the date of passing AET exam;
- Has successfully completed all course requirements of CET Education Program's advanced curriculum (Course 5-12);
- Has documented at least 8,000 on-the-job training hours from the time of their acceptance in the CET Program;
- Has completed the required skills verifications of the advanced curriculum (Course 5-12); and
- Has passed the Level 2 Exam

The Level 2 Exam will be:

- Online;
- Closed book;
- Questions randomly chosen from study questions in the advanced curriculum (Courses 5-12)
- Carried out in accordance with NAEC testing guidelines

1. Proctoring at employer location/testing center.
2. Proctoring at an approved testing center. (ex: Prometric, Pearson, University/colleges)
3. Video proctoring by an approved third-party proctoring service. (ex: Prometric, Software Secure)

Minimum passing score for Level 2 Final Exam is 75%. If the applicant fails the Level 2 Final Exam, the following process will be applicable:

- After the 1st Time – The candidate may retake the examination (2nd attempt) after a 15-day waiting period,
- After Failing the 2nd Time – The candidate may retake the examination (3rd attempt) after a 15-day waiting period and paying a $100 fee,
- After Failing the 3rd Time – The candidate may retake the examination (4th attempt) after a 60-day waiting period and paying a $100 fee. Additionally, the candidate's CET-S, and an officer of the candidate's company, must submit a signed and dated statement certifying thatthe candidate studied the respective curriculum chapter(s) that the candidate failed.
- After Failing the 4th Time – The candidate must repeat the entire Advanced Curriculum.
- After passing the Level 2 exam the next step to become CET certified will be to complete CET certification application at naec.org under Certification tab applying with education option completion of CET education program.

Curriculum Outline

Class hours

COURSE 1: INTRODUCTION TO ELEVATORS

Unit 1: Elevator History & Basic Safety 35
Unit 2: Basic Print Reading 24
Unit 3: Handling Material, Tools, Rigging and Hoisting 20
Course 1 total: Class hours – 79
Field hours – 1000

COURSE 2: BASICS OF INSTALLING ELEVATOR COMPONENTS

Unit 4: Pit Equipment 25
Unit 5: Guide Rails 10
Unit 6: Machine Room Equipment 30
Unit 7: Hoistway Equipment 25
Course 2 total: Class hours – 90
Field hours – 1000

YEAR 1: TOTAL CLASS HOURS = 169 / TOTAL FIELD HOURS = 2,000

COURSE 3: MAINTENANCE PRACTICES AND TESTING

Unit 8: General Maintenance Practices 22
Unit 9: Maintenance of Traction Elevators 30
Unit 10: Maintenance of Hydraulic Elevators 20
Unit 11: Maintenance of Escalators and Moving Walks 25
Course 3 total: Class hours – 97
Field hours – 1000

COURSE 4: ELECTRICAL SAFETY AND THEORY

Course 4: Electrical Safety and Theory 65
Course 4 total: Class hours – 65
Field hours – 1000

YEAR 2: TOTAL CLASS HOURS = 152 / TOTAL FIELD HOURS = 2,000

COURSE 5: ELEVATOR DOORS AND EQUIPMENT

Unit 12: Elevator Doors and Equipment 20
Course 5 total: Class hours - 20
Field hours – 300

COURSE 6: ELECTRIC TRACTION ELEVATORS

Part 1: Electric Principles 35
Part 2: Electric Elevator Components 35
Part 3: Elevator Troubleshooting 35
Course 6 total: Class hours – 105
Field hours – 1400

COURSE 7: ELECTRICAL WIRING AND EQUIPMENT

Unit 13: Construction, Wiring and Equipment 20
Course 7 total: Class hours – 20
Field hours – 300

YEAR 3: TOTAL CLASS HOURS = 145 / TOTAL FIELD HOURS = 2,000

COURSE 8: HYDRAULIC THEORY AND INSTALLATION

Unit 14: Hydraulics 35

Course 8 total: Class hours – 35
Field hours – 400

COURSE 9: BASIC ELECTRONICS AND FUNDAMENTALS

Unit 15: Basic Electronics and Solid State 40

Course 9 total: Class hours – 40
Field hours – 600

COURSE 10: MACHINERY TROUBLESHOOTING, ROPE REPLACEMENT

Unit 16: Elevator Rope Replacement 6
Unit 17: Machinery Troubleshooting/repair (P-8) 24

Course 10 total: Class hours – 30
Field hours – 400

COURSE 11: ESCALATORS AND MOVING WALKS

Unit 18: Escalators and moving walks 20

Course 11 total: Class hours – 20
Field hours – 300

COURSE 12: ACCESSIBILITY

Unit 19: Introduction to the Vertical Transportation Industry (CAT Course 1)..... 20

Course 12 total: Class hours – 20
Field hours – 300

YEAR 4: TOTAL CLASS HOURS = 145 / TOTAL FIELD HOURS = 2,000

Total Class hours 621

Total Field hours 8000

ROLE OF THE CET-S

- Help the Candidate succeed in completing the CET Education Program
- Ensure that candidates have the required basic skills to complete the program study materials.
- Assist candidates with their program application.
- Ensure that candidates have met all their requirements prior to taking each exam.
- Ensure that the online exams are taken in accordance with NAEC Testing Guidelines.

CET-S RESPONSIBILITIES TO THE EMPLOYER

Like any industry-based training program, the CET Education program requires coordination between the learner and company operations to help ensure consistency in training, conservation of human and fiscal resources, and assurance that the related activities are conducted within the company policies, procedures, and respective industry safety rules, regulations, and codes. There are several key responsibilities associated with the CET-S and company operations. These responsibilities include the following:

- To help screen and identify new employees who have the potential to successfully complete the training program. Generally, most companies require new employees to go through a probationary period of three to six months. During this period, the employer must determine if the respective employee is trainable for selected technical positions and must ensure that the employee follows company policies and safe practices in the workplace. During this period, attitudes toward safety and learning are observed. Although there is not a yard stick or examination that can measure these qualities, the employer, which includes the company supervisors, knows from experience if a probationary employee has these characteristics. With this in mind, a critical responsibility for the CET-S is to help the employer determine if the respective employee has these characteristics and if having the employee sponsored by the company for the CET education program is worthwhile investment.
- To ensure that all the internal company paperwork for the candidate is properly completed and maintained (e.g., purchase orders and checks if the company is paying for the program, training records, etc.). Although the CET-S would not actually be responsible for completing this paperwork, the CET-S would supervise the completion of such requirements.
- To ensure that the candidate has opportunities to learn and complete the various skills and tasks correlated with the CET Education Program and that appropriate supervisors assist in the skills verification portion of the program.
- To ensure that all program assessments and examinations are in fact taken by each assigned Candidate and that these assessments and examinations were conducted in an environment conducive for such activities as specified by the NAEC Education Program. This responsibility includes ensuring that the assessments and examinations are properly proctored.
- To ensure that company management is kept up to date with the progress of each assigned candidate
  - To serve as a liaison between NAEC and the respective company.
  - To ensure that the CET Education Program within the company is conducted in accordance with program guidelines.
  - To ensure that all company and pertinent industry safety standards, procedures, and codes are followed throughout the candidate training activities.

CET-S RESPONSIBILITIES TO THE CANDIDATE

The role of the CET-S in the education program is a required element to help ensure that the candidate completes the program as designed and in a timely manner. This role should be viewed as more of a mentoring process where the CET-S helps guide the candidate though the many stepsof the education program. The specific responsibilities of the CET-S associated with the Candidate are as follows:

- To ensure that the reading and mathematics assessments are completed by each employee that may potentially participate in the education program and that these assessments are conducted in an environment conducive for such activities as specified in other portions of this publication.
- To assist identified employees with completing the online application for the education program.
- To assist the employee, once he or she officially becomes a candidate, in developing a study schedule and assisting the candidate in developing good study habits.
- To assist the employee through the study process by providing a schedule and being available regularly to answer any technical questions the candidate may have.
- To ensure that all training assessments and examinations are in fact taken by each assigned candidate and that these assessments and examinations are conducted in an environment conducive for such activities as specified by the NAEC Certification Board.
- To ensure that all Candidates have access to company personnel to facilitate the skills verification check-off.
- To review the results of examinations taken by the Candidate and to make arrangements for additional study activities in the event that a candidate has failed an examination.
- To take other reasonable efforts to help the candidate successfully complete the NAEC CET Education Program.

CET-S TRAINING KIT

CET-S applicants can purchase the CET-S kit from Elevator World at www.elevatorbooks.com. The kit contains all of the coursework. However, some reference materials that the Candidate receives are not in the CET-S kit. Attached is a book list broken down by year. A CET-S may order these books separately as needed or as a supplemental library for the company. The supplemental books for the CET-S are available at Elevator World.

SUPPLEMENTAL BOOKS FOR CET-S

- Core Curriculum - Year 1-2
  - USB “Safety While Servicing and Installing Elevators”
  - Field Maintenance Guide (by McCain)
  - Elevator Industry Field Employees Safety Handbook
  - The Installation Manual
  - Electric Elevators by Hymens
  - The Maintenance Manual (McCain)
  - The Field Inspection Handbook
  - Elevator Industry Testing Guide

- Sam and Samantha – The Maintainers
- Standard Textbook of Electricity by Hermann
- National Electrical Code (NEC)
- Identification, Installation, Lubrication and Maintenance of Power Transmission Roller Chains in ANSI B29 & B29.3

- Advanced Curriculum - Year 3
  - Education Focus Compilation
  - Electrical Engineering Pocket Handbook
- Advanced Curriculum – Year 4
  - Elevators by Jallings
  - ADA and Building Transportation
  - Basic Electronics – Vols 1 & 2

NAEC CET Education Program Fees

First Year Candidate Fees

		NAEC Member	Non-Member
Candidate Fee includes: ▪ Application, Administration Fee & Testing		$ 250.00	$ 750.00
Candidate Fee includes: ▪ Administration Fee & Testing		$ 215.00	$ 745.00
Course I – Introduction to Elevators		$ 750.00	$ 900.00
▪ Unit 1 – Elevator History & Basic Safety ▪ Unit 2 – Basic Print Reading ▪ Unit 3 – Handling Materials & Tools / Rigging & Hoisting	▪ Skills Verification Portfolio ▪ Video: *Safety While Servicing Elevators* ▪ Video: *Safety While Installing Elevators*	▪ *Elevator Industry Field Employees' Safety Handbook* ▪ Poster of Elevator Systems	
Course II – Basics of Installing Elevator Components		$ 750.00	$ 900.00
▪ Unit 4 – Pit Equipment ▪ Unit 5 – Guide Rails ▪ Unit 6 – Machine Room Equipment	▪ Unit 7 – Hoistway Equipment ▪ Skills Verification Portfolio	▪ *The Installation Manual* ▪ *Electric Elevators*	
Cost for First Year of Program per Candidate		**$ 1,965.00**	**$ 3,295.00**

Second Year Candidate Fees

		NAEC Member	Non-Member
Candidate Fee includes: ▪ Administration Fee & Testing		$ 215.00	$ 745.00
Course III – Maintenance Practices and Testing		$ 750.00	$ 900.00
▪ Unit 8 – General Maintenance Practices ▪ Unit 9 – Maintenance of Traction Elevators ▪ Unit 10 – Maintenance of Hydraulic Elevators ▪ Unit 11 - Maintenance of Escalators and Moving Walks	▪ Skills Verification Portfolio ▪ Poster of Elevator Systems ▪ *The Maintenance Manual* ▪ *The Maintenance Field Guide* ▪ *The Inspection Handbook*	▪ *Identification, Installation, Lubrication & Maintenance of Power Transmission Roller Chains in ANSI B29.1 & B29.3* ▪ *The Field-Testing Handbook* ▪ *Sam and Samantha*	
Course IV – Electrical Safety & Theory		$ 750.00	$ 900.00
▪ Primer - Instructions on how to use textbook and industry-specific questions and answers	▪ *Standard Textbook of Electricity* by Herman ▪ Skills Verification Portfolio	▪ *National Electrical Code (NEC)*	
Cost for Second Year of Program per Candidate		**$ 1,715.00**	**$ 2,545.00**

Third Year Candidate Fees

		NAEC Member	Non-Member
Candidate Fee includes: ▪ Administration Fee & Testing		$ 215.00	$ 745.00
Year III Kit		$ 900.00	$ 1,050.00
▪ Course 5 – Doors & Equipment (Unit 12) ▪ Course 5 Skills Portfolio ▪ Course 6 – Electric Traction Elevators ▪ Course 6 Skills Portfolio	▪ Course 7 – Electrical Wiring and Equipment (Unit 13) ▪ Course 7 Skills Portfolio ▪ Education Focus Compilation, Vols. 1 & 2	▪ Electrical Engineering Pocket Handbook ▪ SuperFlex Installation Guide ▪ WhisperFlex Installation Guide	
Cost for Third Year of Program per Candidate		**$ 1,115.00**	**$ 1,795.00**

Fourth Year Candidate Fees

		NAEC Member	Non-Member
Candidate Fee includes: ▪ Administration Fee & Testing		$ 215.00	$ 745.00
Year IV Kit		$ 1,000.00	$ 1,145.00
▪ Course 8 – Hydraulic Theory and Installation (Unit 14) ▪ Course 8 Skills Portfolio ▪ Course 9 – Basic Electronic and Fundamentals (Unit 15) ▪ Education Focus Compilation, Vol. 3	▪ Course 10 – Machinery Troubleshooting and Rope Replacement (Unit 16 & 17) ▪ Course 10 Skills Portfolio ▪ Course 11 – Escalators and Moving Walks (Unit 18)	▪ Course 11 Skills Portfolio ▪ Course 12 – Accessibility Course 12 Skills Portfolio ▪ *Library of Basic Electronics* ▪ *Elevators* ▪ *ADA & Building Transportation*	
Cost of Fourth Year of Program per Candidate		**$ 1,215.00**	**$ 1,890.00**

Please note that the above fees are subject to change without notice.

CET-S Kit Fees

<table>
<tr><td colspan="2">CET-S Core Curriculum Kit</td><td>$ 1,100.00</td><td>$ 1,250.00</td></tr>
<tr><td>▪ CET-S Training Manual
▪ CET-S Log Book
▪ Unit 1 – Elevator History and Basic Safety
▪ Unit 2 – Basic Print Reading
▪ Unit 3 – Handling Materials & Tools / Rigging & Hoisting
▪ Unit 4 – Pit Equipment</td><td>▪ Unit 5 – Guide Rails
▪ Unit 6 – Machine Room Equipment
▪ Unit 7 – Hoistway Equipment
▪ Unit 8 – General MaintenancePractices
▪ Unit 9 – Maintenance of TractionElevators</td><td colspan="2">▪ Unit 10 – Maintenance of Hydraulic Elevators
▪ Unit 11 – Maintenance of Escalators & Moving Walks
▪ Poster of Elevator Systems
▪ Anatomy of Elevators</td></tr>
<tr><td colspan="2">CET-S Advanced Curriculum Kit</td><td>$ 1,100.00</td><td>$ 1,250.00</td></tr>
<tr><td>▪ CET-S Training Manual
▪ CET-S Log Book
▪ Unit 12 - Elevator Doors & Equip
▪ Course 6 – Electric Traction Elevators
▪ Unit 13 - Construction Wiring & Equipment</td><td>▪ Unit 14 - Hydraulic Theory &Installation
▪ Unit 15 - Teachers Guide to Questions & Exercises for BasicElectronics and Fundamentals
▪ Unit 16 - Elevator RopeReplacement
▪ Unit 17 – Machine Troubleshooting and Repair</td><td colspan="2">▪ Unit 18 - Escalators andMoving Walks
▪ Unit 19 - Accessibility Equipment, Safety, and Installation</td></tr>
<tr><td>CET-S Complete Curriculum Kit</td><td>Includes all curriculum textbooks and training aids for the entire program.</td><td>$ 2,000.00</td><td>$ 2,150.00</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="4">(Please note each CET-S Kit (Core & Advanced) can be one-time purchases – the kits can be maintained in-houseand used by more than one CET-S. The CET-S Training Manual and CET-S Log Books are elements of the kit that cannot be shared. They can be purchased separately after the purchase of the initial Kit if you have multiple CET-S' in your company)</td></tr>
<tr><td colspan="2">Additional CET-S Training Manuals</td><td>$ 55.00 EACH</td><td>$ 70.00 EACH</td></tr>
<tr><td colspan="2">Additional/replacement CET-S Log Books</td><td>$ 30.00 EACH</td><td>$ 35.00 EACH</td></tr>
<tr><td colspan="2">Replacement Units 1-18</td><td>$ 60.00 EACH</td><td>$ 70.00 EACH</td></tr>
</table>

Please note that the above fees are subject to change without notice.

Code of Ethics

Every program participant is required to sign a document attesting that he or she will follow the NAEC CET Code of Ethics.

CANDIDATE CODE OF ETHICS

In studying to become a CET, studying to renew a CET certification, and working as a CET, I understand and agree to follow all elements of the NAEC CET Code of Ethics as specified in the following:

- *Providing falsified or misleading information related to my CET renewal constitutes good and sufficient grounds for the immediate cancellation of my CET Certification.*
- *Providing falsified or misleading information related to my CET Candidate Skills Verification constitutes good and sufficient grounds for the immediate cancellation of my CET Candidate status. Providing falsified or misleading information related to a CET Candidate Skills Verification constitutes good and sufficient grounds for the immediate cancellation of my CET status.*
- *Cheating or receiving help of any type not authorized by the NAEC on any education program examination or test constitutes good and sufficient grounds for the immediate cancellation of my CET Candidate status.*
- *Providing falsified or misleading information on work related documents, reports, and logs while working as a CET constitutes good and sufficient grounds for the immediate cancellation of my CET status.*
- *Failing to follow related industry codes, standards, local and federal laws related to my work-related duties, and company work rules constitutes good and sufficient grounds for the immediate cancellation of my CET status.*

CET-S CODE OF ETHICS

In carrying out the responsibilities of a CET-S, I understand and agree to follow all elements of the NAEC CET-S Code of Ethics as specified in the following:

- *Ensure that every candidate under my charge is dealt with in a fair and unbiased manner.*
- *Ensure that the confidentiality of every CET candidate under my charge is protected and that personal and CET program progress information will only be provided to the management of the sponsoring company and supervisors required to know to properly conduct their jobs.*
- *Ensure that CET program assessments and examinations of every CET under my charge are properly proctored and that verification by legal identification with pictures is provided to the proctor before the respective CET candidate takes each assessment and examination. In the case of the CET program, proper proctoring means that the CET candidate will not be permitted to use books, notes, or any other information during the examinations and that no one is permitted to help or coach the CET candidate during the examinations. Also, there will be at least one company employee in the same room with the CET candidate during the entire assessment and examination process.*
- *Ensure that the skills verification for every CET candidate under my charge is signed off only by a qualified CET and that verification by legal picture identification is provided to the CET who will be conducting skills verification for the respective CET candidate.*
- *Notify my employer and the NAEC in the event that I have witnessed, or have reason to believe, that an individual has obtained CET candidate status, CET, or CET-S certification under false pretenses.*
- *To act in a professional manner when conducting CET-S responsibilities*

Education Program Curriculum Details

Core Curriculum

The CET Education Core Curriculum covers approximately two years of study and is divided into four courses. All coursework is available in complete kits from Elevator World, Inc. at www.elevatorbooks.com. Kits include required supplemental materials.

COURSE 1: INTRODUCTION TO ELEVATORS

Class hours: 79 / Field hours: 1,000

LEARNING OBJECTIVES

Upon completion of Course 1, the candidate should have:

- Gained knowledge of elevator history and equipment.
- Gained knowledge of overall safe methods of operation in the industry.
- Gained knowledge of the elevator related drawings and terminology used in the industry.
- Demonstrated the ability to properly handle material and assist in hoisting and rigging.
- Demonstrated the ability to identify, use and care for the tools involved in the industry.
- Demonstrated the ability to identify, use and care for the personal protective equipment.

Unit 1: ELEVATOR HISTORY AND BASIC SAFETY

1. History of Elevators
2. Elevator Industry Organizations
3. Anatomy of an Elevator
4. Types of Elevators and Driving Machines
5. Escalators and Moving Walks
6. Applicable Codes and Publications
7. Work of the Elevator Professional
8. General Safety
9. Component Installation Safety Practices
10. Service Safety
11. Terminology

Unit 2: BASIC PRINT READING

1. Print Terminology
2. Drawing to Scale
3. Introduction to Installation Drawings
4. Detail Drawing and Layout
5. Fits, Tolerances and Fasteners

Unit 3: HANDLING MATERIALS; TOOLS; RIGGING AND HOISTING

1. Handling Materials and Tools
2. Rigging and Hoisting
3. Handling Materials – Storage at the Jobsite

ADDITIONAL REQUIRED TRAINING

- Successful completion of an OSHA 10hr or 30hr training course.

ADDITIONAL REFERENCE MATERIALS

- *Elevator Industry Field Employees' Safety Handbook*
- *Field Maintenance Guide* by Zack McCain
- *Safety Training for Elevator Service & Construction* (Video)
- Poster of Elevator Systems

COURSE 2: BASICS OF INSTALLING ELEVATOR COMPONENTS

Class hours: 90 / Field hours: 1,000

LEARNING OBJECTIVES

Upon completion of Course 2, the candidate should have:

- Gained fundamental knowledge of all components that comprise an elevator installation.
- Gained fundamental knowledge of the method of installing each component.
- Gained fundamental knowledge of the code related requirements for each component.

Unit 4: PIT EQUIPMENT

1. Introduction and Pit Construction
2. Buffers
3. Governor Rope Tension Sheaves
4. Compensating Equipment
5. Tension Sheaves for Selectors and Floor Controllers
6. Limit Switches

Unit 5: GUIDE RAILS

1. Guide Rail Construction and Code Requirements
2. Plumbing the Hoistway
3. Guide Rail Bracket Fastening and Setting
4. Installing the Guide Rails
5. Guide Rail Gauging, Aligning and Filing

Unit 6: ELECTRIC TRACTION ELEVATORS

1. Machine Installation
2. Machine Room Accessories and Installation
3. Hydraulic Components

Unit 7: HOISTWAY EQUIPMENT

1. Car and Counterweight Assemblies
2. Elevator Rope and Roping
3. Hydraulic Driving Components
4. Top of Car Equipment
5. Operating Fixtures and ADA

ADDITIONAL REFERENCE MATERIALS

- *The Installation Manual*
- *Electric Elevators* by Fred Hymans

COURSE 3: MAINTENANCE PRACTICES AND TESTING

Class hours: 87 / Field hours: 1,000

LEARNING OBJECTIVES

Upon completion of Course 3, the candidate should have gained:

- Fundamental knowledge of all components that comprise an elevator installation.
- Fundamental knowledge of the method for maintaining, adjusting and performing the replacement of maintenance related components.
- Fundamental knowledge of code related requirements.
- Fundamental knowledge of code required system testing.

Unit 8: GENERAL MAINTENANCE PRACTICES

1. Lubrication
2. Bolting Practices
3. Elevator Ropes
4. Wiring Diagrams
5. Belts and Chains
6. Code Requirements
7. Testing Requirements

Unit 9: MAINTENANCE OF TRACTION ELEVATORS

1. Introduction
2. Maintenance inside the Car and outside the Hoistway
3. Maintenance in Machine Room
4. Top of Car and Hoistway Maintenance
5. Pit and Bottom of Car Maintenance
6. Maintenance Code Requirements
7. Tests

Unit 10: MAINTENANCE OF HYDRAULIC ELEVATORS

1. Introduction
2. Maintenance inside the Car and outside the Hoistway
3. Maintenance in Machine Room
4. Top of Car and Hoistway Maintenance
5. Pit and Bottom of Car Maintenance
6. Maintenance Code Requirements
7. Tests

Unit 11: MAINTENANCE OF ESCALATORS AND MOVING WALKS

1. Introduction
2. Exterior Maintenance
3. Interior Maintenance
4. Testing

ADDITIONAL REFERENCE MATERIALS

- *The Maintenance Manual* by Zack McCain
- *The Maintenance Field Guide* by Zack McCain
- *The Inspection Handbook* by Zack McCain
- *Sam and Samantha* by Elevator World

- *Field Employees' Elevator Testing Manual* by Jim Runyan & Zack McCain
- *Identification, Installation, Lubrication and Maintenance of Power Transmission Roller Chains in ANSI B29.1 & B29.3*

COURSE 4: ELECTRICAL SAFETY AND THEORY

Class hours: 65 / Field hours: 1,000

LEARNING OBJECTIVES

Upon completion of Course 4, the candidate should:

- Have an understanding of the basic aspects of working safely around electrical equipment.
- Have an understanding of the principles associated with electricity and electrical circuits.
- Be able to explain where electricity comes from; what voltage, current and resistance are and how their values can be calculated for various types of circuits.
- Be able to explain how electrical circuits are affected by induction, inductance and capacitance.
- Have an understanding of the basic concepts associated with the operation of AC circuits.
- Be familiar with the National Electrical Code and its purpose.

Course 4: ELECTRICAL SAFETY AND THEORY

- Introduction/Safety
- Atomic Structure
- Electrical Quantities and Ohm's Law
- Static Electricity
- Magnetism
- Resistors
- Series Circuits
- Parallel Circuits
- Combination Circuits
- Measuring Instruments
- Using Wire Tables and Determining Conductor Sizes
- Batteries and Other Sources of Electricity
- Magnetic Induction
- Alternating Current
- Inductance in AC Circuits
- Capacitors
- Capacitance in AC Circuits
- Three Phase Circuits
- Single Phase Transformers
- National Electric Code (NEC)

REQUIRED TEXTBOOK

- *Standard Textbook of Electricity* by Stephen L. Herman

ADDITIONAL REFERENCE MATERIALS

- *National Electrical Code (NEC)*

Advanced Curriculum

The CET Education Advanced Curriculum covers approximately two years of study and is divided into two segments. Year Three kit contains materials and instructions on Courses 5-7 and Year Four kit contains materials and instructions on Courses 8-12. All coursework is available in com- plete kits from Elevator World, Inc. at www.elevator books.com. Kits include required supplemental materials.

COURSE 5 – ELEVATOR DOORS AND EQUIPMENT

Class hours: 20 / Field hours: 300

LEARNING OBJECTIVES

Upon completion of Course 5, the candidate should:

- Have gained knowledge of the installation of elevator hoistway entrances and doors, including car door and operators
- Have gained knowledge of installation of car door and operators
- Have gained knowledge of the principles of operation of various types of door operators

Unit 12: ELEVATOR DOORS AND EQUIPMENT

1. Door Types
2. Preparation of Shaft and Clearances
3. Installation of Sliding Passenger Elevator Entrances
4. Hoistway Equipment
5. Car Equipment
6. Swing Hoistway Doors
7. Types of Freight Doors
8. Preparation of Site
9. Freight Door Systems
10. Car Gate System
11. Retiring Cam System
12. Controller
13. Dumbwaiter Overview
14. Final Adjustments and Maintenance
15. Preliminary Drawings and Field Conditions
16. Anatomy of Dumbwaiter Doors & Install
17. Anatomy of Dumbwaiter Gates & Install
18. Dumbwaiter Door Interlocks and Cams
19. Maintenance, Troubleshooting and Replacement

Class hours: 105 / Field hours: 1,400

LEARNING OBJECTIVES

Upon completion of Course 6, the candidate should:

- Have obtained a detailed knowledge of the construction and operation of AC machines used on elevator systems.
- Have obtained a detailed knowledge of the construction and operation of DC machines used on elevator systems.
- Understand the Ward Leonard System of obtaining DC supply and relate the Ward Leonard System to elevator control.
- Be able to diagnose electrical faults and apply remedial action.
- Be able to sketch mechanical and electrical wiring diagrams.
- Be able to explain with the aid of diagrams, the construction and operation of field regulators.

Part 1: AC AND DC MOTORS, GENERATORS AND MOTOR CONTROL

1. AC Motors
2. DC Motors
3. Motor Control
4. Regulators
5. Gearless Machines
6. Braking
7. Electrical Fault Finding

Part 2: ELEVATOR RELATED CIRCUITS AND BASIC CIRCUIT ANALYSIS

1. Elevator Related Circuits
2. Schematic Circuit Diagrams
3. Testing Instruments and Procedures
4. Sequence of Investigation

Part 3: TROUBLESHOOTING

1. Tools
2. Wiring Diagrams/Prints
3. Troubleshooting

COURSE 7 – ELECTRICAL WIRING AND EQUIPMENT

Class hours: 20 / Field hours: 300

LEARNING OBJECTIVES

Upon completion of Course 7, the candidate should have obtained knowledge on:

- The sequential steps required to properly review plans and blueprints to develop a plan of the installation of wires and raceways
- How to develop a list of materials to order and have delivered to the worksite to properly install wiring and related support elements to elevator components.
- Machine room and hoistway layout
- Box termination
- Conductor installation in conduit and tips on how to make such installation easier
- Traveling cable application and identification and related requirements
- Traveling cable installation
- Piping and wiring of car enclosures
- Hoistway and box clearances
- Initial start up and safety precautions
- Steps to take to ensure protection of components
- Initial car running

Unit 13: CONSTRUCTION, WIRING AND EQUIPMENT

1. Planning and Installation
2. Raceway and Conductor Installation
3. Traveling Cable Installation
4. Powering Up the Elevator

YEAR 3 ADDITIONAL REFERENCE MATERIALS

- *Education Focus Compilation*
- *Electrical Engineering Pocket Handbook*
- *Superflex Installation Guide* (Draka)
- *Whisperflex Installation Guide* (Draka)

COURSE 8 – HYDRAULIC THEORY AND INSTALLATION

Class hours: 35 / Field hours: 400

LEARNING OBJECTIVES

Upon completion of Course 8, the candidate should have obtained knowledge on:

- The fundamental hydraulic principles including Pascal's Law and how to use the associated principles to calculate pressure in a hydraulic elevator system
- Drilling and casing the jack hole required for direct-acting hydraulic elevators
- The jack and major components and installation
- Installing and piping the hydraulic machine for both machine-room type and machine-room-less types.
- The hydraulic piping and piping methods
- The installation of guide rails and related components including the car sling, entrances and wiring in accordance with the A17.1 Safety Code for Elevators and Escalators
- The installation of the enclosure, the integral valve operation and the final hoistway adjustments.

Unit 14: HYDRAULIC THEORY AND INSTALLATION

1. Basic Hydraulic Theory
2. Drilling and Casing the Jack Hole
3. Installing the Jack and Components
4. Installing and Piping the Hydraulic Machines
5. Guide Rails, Car Slings, Entrances and Doors, and Wiring
6. Car Enclosure and Operation

COURSE 9 – BASIC ELECTRONICS AND FUNDAMENTALS

Class hours: 40 / Field hours: 600

LEARNING OBJECTIVES

Upon completion of Course 9, the candidate should have obtained knowledge on:

- Basic electronic concepts including an overview of the history of electronics.
- Resistors, including fixed resistors, variable resistors and resistors used in various circuits.
- Capacitor types and applications, capacitor physics, resistor-capacitor (RC) networks; capacitor chips and common causes of capacitor failure.
- Switches, keyboards and electromechanical relays.
- Magnetic components including inductors, impedance, transformers and the testing of magnetic components.
- Miscellaneous passive component and technology trends including connectors, indictor lamps and crystals.
- Surface-mounted-device (SMD) technology, component miniaturization and used of alloys to replace gold.
- Discrete semiconductors, including power MOSFETs and insulated gate bipolar transistors (IGBT).
- Diode Manufacture including silicon rod production, wafer production and wafer scribing.
- Diode characteristics and specifications including Zener diodes and part-number protection.
- Thyristors including thyristor and silicon-controlled rectifiers (SCRs), SCR mechanisms with DC andAC supplies, SCR applications, triode AC switches (TRIACs), diode AC switches (DIACs) and heat transfer considerations.
- Bipolar transistors including transistor mechanisms as linear amplifiers and digital switches and bipolar transistor applications.
- Field-effect transistors (FET) including junction FET construction and mechanism, junction FET operations as amplifiers and digital switches and metal-oxide semiconductor FET (MOSFET).
- Light-emitting diodes (LEDs) including construction, packages, and specifications.
- LED displays including segmented digital displays, dot-matrix digital display and display selection criteria and specifications.
- Other display technologies including gas-discharge displays, vacuum fluorescent displays, cathode ray tubes, indicator-panel displays and liquid-crystal displays (LCDs).
- Opto-coupler including the spectral response of silicon and slotted opto-coupler applications.
- Solid-state relays (SSRs) and an update on opto-electronic technology.

Unit 15: STUDY QUESTIONS AND SKILLS FOR ELECTRONICS AND SOLID STATE

1. Basic Concepts
2. Resistors
3. Capacitors
4. Switches, Keyboards and Relays
5. Magnetic Components
6. Miscellaneous Passive Components and Technology Trends
7. Discrete Semiconductors, Definitions and General Information
8. Diode Manufacture
9. Diode Characteristics and Specifications
10. Diode Applications
11. Thyristors (AC Switches)
12. Bipolar Transistors
13. Field Effect Transistors (FETs)
14. Light Emitting Diodes (LEDs)
15. LED Displays
16. Other Display Technologies
17. Opto Couplers (OptoIsolators)
18. Solid State Relays (SSRs) and Optoelectronic Technology Update

Required Textbooks:

- *Library of Basic Electronics, Books 1 and 2* by Sy Levine

COURSE 10 – MACHINERY TROUBLESHOOTING AND ROPE REPLACEMENT

Class hours: 30 / Field hours: 400

LEARNING OBJECTIVES

Upon completion of Course 10, the candidate should have obtained knowledge on:

- The terminology associated with elevator rope replacement
- The correct inspection procedures for various configurations of elevator roping and the code requirements for removal criteria
- The inspection of sheaves to see if they are in sufficient condition to put on new ropes
- How to determine the right ropes to order
- Proper handling of wire rope so that it is not damaged prior to installation
- Procedure to properly hang ropes
- Maintenance and troubleshooting for common problems associated with wire ropes and sheaves
- The different machinery types commonly found and some older systems no longer installed but still in use in mechanical driving systems
- Troubleshooting methods, the importance of proper diagnosis, and the planning, communication and safety aspects of the repair or replacement of mechanical equipment
- Components found on elevator machinery and some common methods for the proper repair, replacement and adjustment of these components.
- Components commonly found on elevator installations that include governors, tensions and weight frames, car frames and platforms, safeties and release carriers, guide assemblies, buffers and mechanical selector systems
- The proper testing and lubrication of repaired and/or replaced machinery before returning the equipment back to service

Unit 16: ELEVATOR ROPE REPLACEMENT

1. Wire-Rope Terminology
2. Procedures for Inspection and Criteria for Rope Removal
3. Additional Inspections Prior to Re-Roping
4. Re-Roping
5. Field Maintenance and Troubleshooting

Unit 17: MACHINERY TROUBLESHOOTING/REPAIR

1. Mechanical Driving Systems
2. Troubleshooting, Diagnosis and Planning
3. Repair and Replacement of Machinery Components
4. Related Mechanical Equipment
5. Testing and Lubrication of Equipment

COURSE 11 – ESCALATORS AND MOVING WALKS

Class hours: 20 / Field hours: 300

LEARNING OBJECTIVES

Upon completion of Course 11, the candidate should have obtained knowledge on:

- Safety procedures and requirements associated with the installation, testing, inspection and maintenance of escalators and moving walkways
- *ASME A17.1 Safety Code for Elevators and Escalators* as it pertains to the installation, testing, inspection and maintenance of escalators and moving walkways
- Specification of generic equipment and tolls required to assist with the installation of escalators and moving walkways
- Installation of the truss for escalators including leveling, centering, adjusting and anchoring.
- Installation of the upper and lower carriage
- Installation and powering up of controllers
- Step and handrail installation
- Final installation, tests and inspections associated with escalators and moving walks
- Maintenance requirements associated with escalators and moving walks

Unit 18: ESCALATORS AND MOVING WALKS

1. Safety
2. Escalator/Moving Walk Familiarization & Safety
3. Escalator/Moving Walk Safety Code
4. Introduction to Escalator Install Procedure
5. Truss Installation
6. Truss Adjusting and Anchoring
7. Installing Center Line on Truss
8. Upper and Lower Carriage Installation
9. Controller Installation
10. Step and Handrail Installation
11. Final installations, Tests and Inspections
12. Maintenance Requirements

COURSE 12 – ACCESSIBILITY

Class hours: 20 / Field hours: 300

Course 12 is also Course 1 of the Certified Accessibility and Private Residential Lift Technician (CAT) Education Program. It is a “bridge unit” which can be counted towards credit in both programs.

LEARNING OBJECTIVES

Upon completion of Course 12, the candidate should have obtained knowledge on:

- The Accessibility Lift and Private Residence Elevator history, evolution of the national codes and standards and the American with Disabilities Act (ADA) and the impact on the industry
- Associated organizations
- Safety codes, standards and related publications most commonly used.
- Associated terms and definitions
- Types of accessibility lifts and residence elevators in general use with a listing of designed purposes of the various types and their respective uses and limitations, including their drive systems.
- Key safety practices and procedures
- Basics of electrical knowledge including the fundamentals of electricity and the basic structure of matter
- Reading and understanding installation drawings including wiring diagrams, electrical drawing symbols and legends, mechanical drawings, drawing symbols, drawing versions and detail drawings.
- The installation of accessibility lifts and residence elevators

Unit 19: INTRODUCTION TO THE VERTICAL TRANSPORTATION INDUSTRY

1. Vertical Transportation History
2. National Applicable Codes and Regulations
3. Accessibility Industry Glossary of Terms
4. General Safety
5. Types of Accessibility and Residential Equipment
6. Introduction to Basic Electricity
7. Print Reading
8. Installation

YEAR 4 ADDITIONAL REFERENCE MATERIALS

- *ADA and Building Transportation* by Ed Donoghue
- *Elevators* by John Jallings
- *Cylinder Head Packing Booklet* (Texacone)