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HEATING, VENTILATION, AIR CONDITIONING AND REFRIGERATION



MASTER



BASIC



SENIOR

CAREER FIELD EDUCATION AND TRAINING PLAN

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**HEATING, VENTILATION, AIR CONDITIONING AND
REFRIGERATION (HVAC/R) SPECIALTY AFSC 3E1X1
CAREER FIELD EDUCATION AND TRAINING PLAN (CFETP)**

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**HEATING, VENTILATION, AIR CONDITIONING AND
REFRIGERATION SPECIALTY AFSC 3E1X1
CAREER FIELD EDUCATION AND TRAINING PLAN**

PREFACE

1. This Career Field Education and Training Plan (CFETP) is a comprehensive education and training document that identifies life-cycle education/training requirements, training support resources, and minimum requirements for this specialty. The CFETP will provide personnel a clear career path to success and instill rigor in all aspects of career field training.

2. The CFETP consists of two parts used by supervisors to plan, manage, and control training within the career field.

2.1. Part I provides information necessary for overall management of the specialty.

2.1.1. Section A explains how everyone will use the plan.

2.1.2. Section B identifies career field progression information, duties and responsibilities, training strategies, and career field path.

2.1.3. Section C associates each skill level with specialty qualifications (knowledge, education, experience, training and other).

2.1.4. Section D indicates resource constraints (examples: funds, manpower, equipment, facilities, etc.).

2.1.5. Section E identifies transition training guide requirements for SSgt through MSgt.

2.2. Part II includes the following:

2.2.1. Section A identifies the Specialty Training Standard (STS) to include duties, tasks, and technical references to support training, Air Education and Training Command (AETC)-conducted training, wartime course, core task and correspondence course requirements.

2.2.2. Section B contains the course objective list and training standards supervisors will use to determine if Airmen satisfied training requirements.

2.2.3. Section C identifies available support materials. Air Force Qualification Training Packages (AFQTPs) and CerTests support both Upgrade Training (UGT) and qualification training.

2.2.4. Section D identifies a training course index supervisors can use to determine resources available to support training. Included here are both mandatory and optional courses.

2.2.5. Section E identifies MAJCOM-unique training requirements supervisors can use to determine additional training required for the associated qualification needs.

2.2.6. Section F identifies home station training references and courses material required for this specialty in support of contingency/wartime training.

2.2.7. Section F identifies home station training references and courses material required for this specialty in support of contingency/wartime training.

2.2.8. At unit level, supervisors and trainers will use Part II to identify, plan and conduct training commensurate with the overall goals of this guide.

3. Using guidance provided in the CFETP will ensure individuals in this specialty receive effective and efficient training at the appropriate point in their careers. This plan will enable us to train today's work force for tomorrow's jobs.

ABBREVIATIONS AND TERMS EXPLAINED

Advanced Distributed Learning (ADL). Anytime, anyplace learning within DoD consisting of instructional modules comprised of sharable content objectives in an Internet/Intranet environment.

Advanced Training (AT). A formal course which provides individuals who are qualified in one or more positions of their Air Force Specialty (AFS) with additional skills/knowledge to enhance their expertise in the career field. Training is for selected career Airmen at the advanced level of the AFS.

Air Force Career Field Manager (AFCFM). An individual on the Air Staff charged with the responsibility for overseeing all training and career field management aspects of an Air Force specialty or group of specialties.

Air Force Job Qualification Standard/Command Job Qualification Standard (AFJQS/CJQS). A comprehensive task list that describes a particular job type or duty position. Supervisors will use this list to document task qualifications. The tasks on the AFJQS/CJQS are common to all persons serving in the described duty position.

Air Force Qualification Training Package (AFQTP). An instructional package designed for use at the unit to qualify or aid qualification in a duty position, program, or on a piece of equipment. AFQTPs identify the Air Force's standardized method for performing the task. The AFQTP may be printed (paper-based), computer-based, or in other audiovisual media.

Battlefield Airman. Airmen specifically identified as Battlefield Airmen perform tasks to integrate and synchronize air and space operations in the deep or extended battlespace. These Airmen routinely fight with joint maneuver and SOF units.

Career Field Education and Training Plan (CFETP). A comprehensive, multipurpose document encapsulating the entire spectrum of education and training for a career field. It outlines a logical growth plan that includes training resources and is designed to make career field training identifiable, eliminate duplication, and ensure training is budget defensible.

Certification and Testing (CerTest). A multi-media evaluation program used to test an individual's knowledge of principles and procedures in their career field.

Commercial Off The Shelf (COTS). Commercially-procured training products.

Computer-Based Training (CBT). A self-paced stand-alone computer product used to deliver interactive subject and task knowledge.

Continuation Training. Additional training exceeding requirements with emphasis on present and future duty assignments.

Core Task. A task Air Force Career Field Managers (AFCFMs) identified as a minimum qualification requirement within an Air Force specialty or duty position. These tasks exemplify the essence of the career field.

Course Objective List (COL). A publication derived from initial/advanced skills course training standard, identifying the tasks and knowledge requirements, and respective standards provided to achieve a 3-, 5-, and 7-skill level in this career field. Supervisors use the COL to assist in conducting graduate evaluations in accordance with AFI 36-2201v1, *Air Force Training Program, Training Development, Delivery and Evaluation*.

Critical Task. Tasks that have been identified by the work center supervisor as having a detrimental effect on mission accomplishment if not performed correctly. Critical tasks may or may not be the same as core tasks but are mandatory if identified as ‘critical’ to the individual’s position by the supervisor or work center.

Diamond Task (◆). Diamond tasks are extremely important to the career field. Diamond tasks are the same as core tasks with one exception--equipment shortfalls at most locations have created problems with the actual hands-on certification of these tasks. In instances where required equipment is not available for instruction, completion of the task’s AFQTP and passing the corresponding CerTest is all that is required for upgrade and qualification training. Hands-on certification should be accomplished at the first opportunity when equipment is available.

Distance Learning (DL). Formal courses that a training wing or contractor develops for export to a field location (in lieu of resident training) for trainees to complete without the on-site support of a formal school instructor. Some of the means employed to deliver DL are Video Teleseminar (VTS), Video Teletraining (VTT), and Computer-Based Training (CBT). Distance Learning courses are offered by the Air Force Institute of Technology, Air University, and Training Detachment.

Duty Position Task. The tasks assigned to an individual for the position currently held. These include as a minimum all core tasks, critical tasks, and any other tasks assigned by the supervisor.

Enlisted Specialty Training (EST). A mix of formal training (technical school) and informal training (on-the-job) to qualify and upgrade Airmen in each skill level of a specialty.

Exportable Training. Additional training via computer-assisted, paper text, interactive video, or other necessary means to supplement training.

Field Technical Training (Type 4 and Type 7). Special or regular on-site training conducted by a Field Training Detachment (FTD) (Type 4) or by a Mobile Training Team (MTT) (Type 7).

Initial Skills Training. AFS-specific training an individual receives upon entry into the Air Force or upon retraining into a 3-level awarding specialty. Normally, AETC conducts this training at one of their technical training wings.

Instructional System Development (ISD). A deliberate, orderly, and flexible process for planning, developing, implementing, and managing instructional systems. It ensures a cost-efficient approach is employed to teach personnel the knowledge, skills, and attitudes essential for successful job performance.

Occupational Survey Report (OSR). A detailed report showing the results of an occupational survey of tasks performed within a particular AFS.

On-the-Job Training (OJT). Hands-on, over-the-shoulder training conducted to certify personnel in both upgrade (skill-level award) and job qualification (duty position certification) training.

Optimal Training. The ideal combination of training settings resulting in the highest levels of proficiency on specified performance requirements within the minimum time possible.

Proficiency Training. Additional training, either in-residence, exportable advanced training courses, or on-the-job training provided to increase personnel skills and knowledge beyond the minimum required for upgrade.

Qualification Training (QT). Actual hands-on task performance training designed to qualify an individual in a specific duty position. This portion of the dual channel on-the-job training program occurs both during and after the upgrade training process. It is designed to provide the performance skills required to do the job.

Readiness Training Package (RTP). Establishes standard levels of knowledge and proficiency for common Disaster Preparedness and Readiness subject areas by providing instructors with training references, materials, and lesson objectives used in teaching and evaluating the course subject matter.

Representative Sites. Typical organizational units having similar missions, weapon systems or equipment, or a set of jobs, used as a basis for estimating average training capacities and costs.

Resource Constraints. Resource deficiencies, such as money, facilities, time, manpower, or equipment that precludes desired training from being delivered.

Skills Training. A formal course resulting in the award of a skill level.

Specialty Training. A mix of formal training (technical school) and informal training (on-the-job) to qualify and provide Airmen skill level upgrade.

Specialty Training Standard (STS). Describes skills and knowledge that Airmen in a particular AFS need on the job. Additionally, the STS illustrates AFS overall training requirements for both resident and nonresident courses. It further serves as a contract between the Air Education and Training Command (AETC) and the end user.

Spin-up Training (SUT). Training required just prior to select deployment. This training delivers the necessary tools for mission accomplishment. Typically, it is predicated on hard to attain contingency skills.

Standard. An exact value, a physical entity, or an abstract concept, established and defined by authority, custom, or common consent to serve as a reference, model, or rule in measuring quantities or qualities, establishing practices or procedures, or evaluating results; a fixed quantity or quality.

Supplemental Training. Training for a portion of an AFS without a change in AFSC. Formal training on new equipment, methods, and technology that are not suited for on-the-job training.

Total Force. All collective Air Force components (active duty, Reserve, Guard, and civilian elements) of the United States Air Force.

Training Capacity. The capability of a training setting to provide training on specified requirements, based on the availability of resources.

Training Planning Team (TPT). Comprised of the same personnel as a U&TW; however, TPTs are more intimately involved in training development and the range of issues is greater than is normal in the U&TW forum.

Training Requirements Analysis. A detailed analysis of tasks for a particular AFS to be included in the training decision process.

Upgrade Training (UGT). Identifies the mandatory courses, task qualification requirements and correspondence course completion requirements for award of the 5-, 7-, and 9-skill levels.

Utilization and Training Workshop (U&TW). A forum comprised of the AFCFM, MAJCOM Functional Managers (MFMs), Subject Matter Experts (SMEs), and AETC training personnel that determines career ladder training requirements.

PART I

SECTION A - GENERAL INFORMATION

1. Purpose. This CFETP provides information necessary for Air Force Career Field Managers (AFCFMs), MAJCOM functional managers (MFMs), commanders, education and training managers, supervisors, trainers and certifiers to plan, develop, manage, and conduct an effective career field training program. This plan outlines the training that individuals in the AFS should receive in order to develop and progress throughout their career. It identifies initial skills, upgrade, qualification, advanced, and proficiency training.

1.1. Initial skills training. This is the AFS-specific training an individual receives upon entry into the Air Force or upon retraining into this specialty for award of the 3-skill level. Normally, AETC conducts this training at one of the technical training centers.

1.2. Upgrade training. This identifies the mandatory courses, task qualification requirements, and correspondence course completion requirements for award of the 3-, 5-, 7-, and 9-skill levels.

1.3. Qualification training. This is actual hands-on task performance training designed to qualify an Airman in a specific duty position. This training program occurs both during and after the upgrade training process. It is designed to provide the performance skills and knowledge required to do the job.

1.4. Advanced training. This is a formal course that provides individuals who are qualified in one or more positions of their Air Force Specialty (AFS) with additional skills and knowledge to enhance their expertise in the career field. Training is for selected career Airmen at the advanced level of the AFS.

1.5. Proficiency training. This is additional training, either in-residence, exportable advanced training courses, or on-the-job training, provided to personnel to increase their skills and knowledge beyond the minimum requirements for upgrade.

2. The CFETP has several purposes:

2.1. Serves as a management tool to plan, manage, conduct, and evaluate a career field training program. It is used to help supervisors identify training at the appropriate point in an individual's career.

2.2. Identifies task and knowledge training requirements for each skill level in the specialty and recommends education and training throughout each phase of an individual's career.

2.3. Lists training courses available in the specialty and identifies sources of training and training delivery methods.

2.4. Identifies major resource constraints that impact full implementation of the desired career field training process.

3. Uses. MFMs and supervisors will use the plan at all levels to ensure comprehensive and cohesive training programs are available for each individual in the specialty.

3.1. AETC training personnel will develop or revise formal resident, nonresident, field, and exportable training based on requirements established by the users and documented in Part II of the CFETP. They will also work with the AFCFM, Air Force Civil Engineer Support Agency Force Development Division (HQ AFCESA/CEOF) to develop acquisition strategies for obtaining resources needed to provide the identified training.

3.2. MFMs will ensure their training programs complement the CFETP mandatory initial, upgrade, and proficiency requirements and identify requirements that can be satisfied by OJT, resident training, contract training, CerTest, or exportable courses. MAJCOM developed training to support this AFS must be identified for inclusion into the plan.

3.3. Unit Education and Training managers and supervisors must ensure each individual completes the mandatory training requirements (including MAJCOM supplemental requirements) for the upgrade training specified in this plan.

3.4. Each individual will complete the mandatory training requirements specified in this plan. The lists of courses in Part II in this CFETP will be used as a reference to support training.

4. Coordination and Approval. The AFCFM is the approval authority for the CFETP. MAJCOM representatives and AETC personnel will identify and coordinate on the career field training requirements. The AFCFM will initiate an annual review of this document to ensure currency and accuracy. Using the list of courses in Part II, they will eliminate duplicate training.

SECTION B - CAREER FIELD PROGRESSION AND INFORMATION

5. Specialty Descriptions. Heating, Ventilation, Air Conditioning and Refrigeration (HVAC/R) Apprentice, Journeyman, Craftsman and Superintendent.

5.1. Specialty Summary. Installs, operates, maintains, and repairs heating, ventilation, air conditioning, and refrigeration (HVAC/R) systems, combustion equipment, and industrial air compressors. Maintains and repairs non-electric kitchen equipment. Manages HVAC/R functions and activities. Related DoD Occupational subgroup: 720.

5.2. Duties and Responsibilities.

5.2.1. Installs and operates HVAC/R systems and equipment.

5.2.1.1. Interprets drawings and schematics and installs HVAC/R components.

5.2.1.2. Installs, repairs, fabricates, and tests piping and tubing systems.

5.2.1.3. Installs, connects, troubleshoots, and maintains HVAC/R controls.

5.2.1.4. Tests HVAC/R equipment for proper operation.

5.2.1.5. Balances air and water in HVAC systems.

5.2.1.6. Monitors systems operation to ensure efficiency and compliance with technical orders, manufacturer handbooks, local procedures, codes, and directives.

5.2.1.7. Evaluates water treatment for heating and cooling systems.

5.2.1.8. Ensures compliance with safety and environmental regulations for fuels, refrigerants, and hazardous materials

5.2.2. Maintains and repairs HVAC/R equipment systems.

5.2.2.1. Performs recurring maintenance and seasonal overhaul on systems and components.

5.2.2.2. Uses drawings and schematics to analyze and isolate system malfunctions.

5.2.2.3. Troubleshoots malfunctions using technical orders, manufacturer's handbooks, local procedures, codes and directives.

5.2.2.4. Repairs or replaces components.

5.2.2.5. Modifies equipment for specific missions or to increase efficiency.

5.2.2.6. Maintains tools and equipment. Maintains shop tools and equipment. Calibrates test equipment to ensure accuracy.

5.2.3. Advises on problems with HVAC/R equipment and systems.

5.2.3.1. Solves complex maintenance problems by studying layout drawings, wiring and schematic drawings, and by analyzing construction and operating characteristics.

5.2.3.2. Develops and establishes operation and maintenance procedures to ensure maximum efficiency.

5.2.4. Plans and performs facilities surveys.

5.2.4.1. Surveys proposed work to determine resource requirement.

6. Skill and Career Progression. Adequate training and timely progression from the apprentice to the superintendent skill level play an important role in the Air Force's ability to accomplish its mission. It is essential that everyone involved in training do his or her part to plan, manage, and conduct an effective training program. The guidance provided in this part of the CFETP will ensure individuals receive viable training at appropriate points in their careers.

6.1. Apprentice (3-Level).

6.1.1. Upon completion of initial skills training, a trainee will work with a trainer to enhance their knowledge and skills to progress to the 5-level.

6.1.2. Utilize the Career Development Course (CDC), Air Force Qualification Training Packages (AFQTPs) and other exportable courses for subject and task fundamentals in the career field. Successfully complete applicable CerTests.

6.1.3. Once trained and task certified, a trainee may perform the task unsupervised.

6.1.4. After all upgrade training requirements are completed, supervisors and Unit Education and Training Managers (UETMs) coordinate upgrade procedures.

6.1.5. NOTE: All trainees are automatically enrolled in the Community College of the Air Force (CCAF) when awarded their primary AFSC.

6.2. Journeyman (5-Level).

6.2.1. 5-Levels may be assigned job positions such as team leader, shift supervisor, and task certifier.

6.2.2. Enter into continuation training to broaden experience base and to advance to the 7-level.

6.2.3. Attend the Airman Leadership School (ALS) after serving 48 months in the Air Force or selection to the rank of SSgt (active duty only). Either the in-residence or correspondence course is required for Air National Guard/Air Force Reserve Command (ANG/AFRC) personnel.

6.2.4. Use CDCs and other reference material to prepare for Weighted Airman Performance Systems (WAPS) testing.

6.2.5. Continue pursuing a Community College of the Air Force (CCAF) degree.

6.2.6. After all upgrade training requirements are complete, supervisors and UETMs coordinate upgrade procedures.

6.3. Craftsman (7-Level).

6.3.1. A craftsman may expect to fill various supervisory and management positions such as shift leader, mobility team chief, supervisor, or task certifier.

6.3.2. Completion of 100% core/diamond task training is prerequisite to the award of the 7-level.

6.3.3. Must complete 7-level craftsman course and, as a minimum, 12 months OJT before award of the 7-level.

6.3.4. Seven-levels should take continuation training courses or obtain additional knowledge on management of resources and personnel.

6.3.5. Continued academic education through CCAF and higher degree programs is encouraged.

6.3.6. Attend the Noncommissioned Officer Academy (NCOA) after promotion to TSgt (active duty only). Either the in-residence or correspondence course is required for Air National Guard/Air Force Reserve Command (ANG/AFRC) personnel.

6.3.7. After all upgrade training requirements are completed, supervisors and UETMs coordinate upgrade procedures.

6.4. Superintendent. (9-Level)

6.4.1. A 9-level can be expected to fill positions such as flight chief, zone superintendents, and various staff positions.

6.4.2. Must be a SMSgt for award of the 9-skill level.

6.4.3. Completion of Civil Engineer Superintendent Course (Air Force Institute of Technology (AFIT) WMGT 570) is prerequisite for award of the 9-level.

6.4.4. Should pursue increased knowledge of budget, manpower, resources, and personnel management.

6.4.5. After completion of CCAF, recommend the pursuit of additional higher education and completion of courses outside of their career AFS.

6.5. Civil Engineer Manager (CEM).

6.5.1. CEMs work in a variety of similar jobs and functional areas where general managerial and supervisory abilities can be most effectively used and challenged.

6.5.2. Must be selected for CMSgt and possess qualifications as a 3E191.

6.5.3. Resident graduation of the USAF Senior NCO Academy (SNCOA) is a prerequisite for CMSgt sew-on (active duty only). Either the in-residence or correspondence course is required for Air National Guard/Air Force Reserve Command (ANG/AFRC) personnel.

6.5.4. Completion of the Chief Leadership Course is mandatory.

7. Training Decisions. The CFETP uses a building block approach (simple to complex) to encompass the entire spectrum of training requirements for the HVAC/R career field. The spectrum includes a strategy for when, where, and how to meet the training requirements. The strategy must be apparent and affordable to reduce duplication of training and eliminate a disjointed approach to training. The following decisions were made at the career field Training Planning Team (TPT) conference held at Sheppard AFB, TX in January 2005.

7.1. Initial Skills Training. The initial skills course was reviewed for content. Additions, deletions, and modifications were made to the course. Wartime training tasks were identified. Additional contingency training was also identified.

7.2. Five Level Upgrade Training Requirements. Existing CDCs were reviewed and updated to ensure only current material remained and new technology information was added.

7.3. Seven Level Upgrade Training Requirements. 7-level training requirements were reviewed. Civil Engineering common 7-level training was discontinued in favor of AFSC specific 7-level training.

7.4. Proficiency Training. Any additional knowledge and skill requirements that were not taught through initial skills or upgrade training are assigned as continuation training.

7.4.1. The purpose of continuation training is to provide training exceeding minimum upgrade training requirements with emphasis on present and future duty positions.

7.4.2. MAJCOMs must develop a continuation-training program that ensures personnel in the HVAC/R career field receive the necessary training at the appropriate point in their careers.

7.4.3. The training program will identify both mandatory and optional training requirements.

7.5. Supplemental Training. Subject Matter Experts (SME) and the Training Committee reviewed supplemental training courses for technical accuracy and identified training that was no longer required. They revalidated the remaining courses as necessary to fully support career progression in the AFS.

7.6. CerTest. Originally, the CerTest program was developed to support transition training and meet DoD certification requirements. Now, it is also the singular platform to launch AFQTP tests and supplement the evaluation of OJT.

8. Community College of the Air Force (CCAF) Academic Programs. Airmen are automatically enrolled in CCAF upon completion of basic military training. CCAF provides the opportunity to obtain an Associate in Applied Sciences Degree. In addition to its associate's degree program, CCAF offers the following:

8.1. Occupational Instructor Certification. Upon completion of instructor qualification training (consisting of the instructor methods course and supervised practice teaching), CCAF instructors who possess an associates degree or higher may be nominated by their school commander and/or commandant for certification as an occupational instructor.

8.2. Trade Skill Certification. When a CCAF student separates or retires, a trade skill certification is awarded for the primary occupational specialty. The College uses a competency-based assessment process for trade skill certification at one of four proficiency levels: Apprentice, Journeyman, Craftsman (Supervisor), or Master Craftsman (Manager). All are transcribed on the CCAF transcript.

8.3. The Mechanical and Electrical Technology Associates Degree (4VGA) applies to AFSC 3E1X1.

8.3.1. Degree Requirements. Prior to completing an Associates Degree, the individual must be awarded a 5-level and the following requirements must be met:

Course	Semester Hours
Technical Education	24
Leadership, Management, and Military Studies	6
Physical Education	4
General Education	15
Program Elective	15
Technical Education; Leadership, Management, and Military Studies; or General Education	
Total	64

8.3.2. Technical Education (24 Semester Hours): A minimum of 12 semester hours of Technical Core subjects and courses must be applied and the remaining semester hours applied from Technical Core or Technical Elective subjects and courses.

Technical Core Requirements	Semester Hours
CCAF Internship	16
Electrical Power Production	20
Electrical Systems	20
Heating Systems	20
Refrigeration and Air Conditioning	20

Technical Electives	Semester Hours
AF Enlisted Professional Military Education	12
Air Distribution and Filtering Systems	3
Alternate Heating and Cooling	3
Blueprint Reading/Schematic Diagrams	6
Building Codes and Ordinance	3
Computer Science	6
Control Systems/Maintenance	6
Electronics	6
Engine Principles	3
Environmental Awareness	3
Environmental Compliance	3
Industrial Management	3
Industrial Safety	3
Motor, Starter, and Control Devices	6
Quality Assurance	3
Technical Mathematics (College Algebra or Higher)	3
Technical Physics	4
Technical Writing	3
Welding and Pipefitting	3

8.3.3. Leadership, Management, and Military Studies (6 Semester Hours): Professional military education, civilian management courses accepted in transfer and/or by testing credit.

8.3.4. Physical Education (4 Semester Hours): This requirement is satisfied by completion of Basic Military Training.

8.3.5. General Education (15 Semester Hours): Applicable courses must meet the criteria for application of courses to the general education requirements and be in agreement with the definitions of applicable general education subjects/courses as provided in the *CCAF General Catalog*.

General Education	Semester Hours
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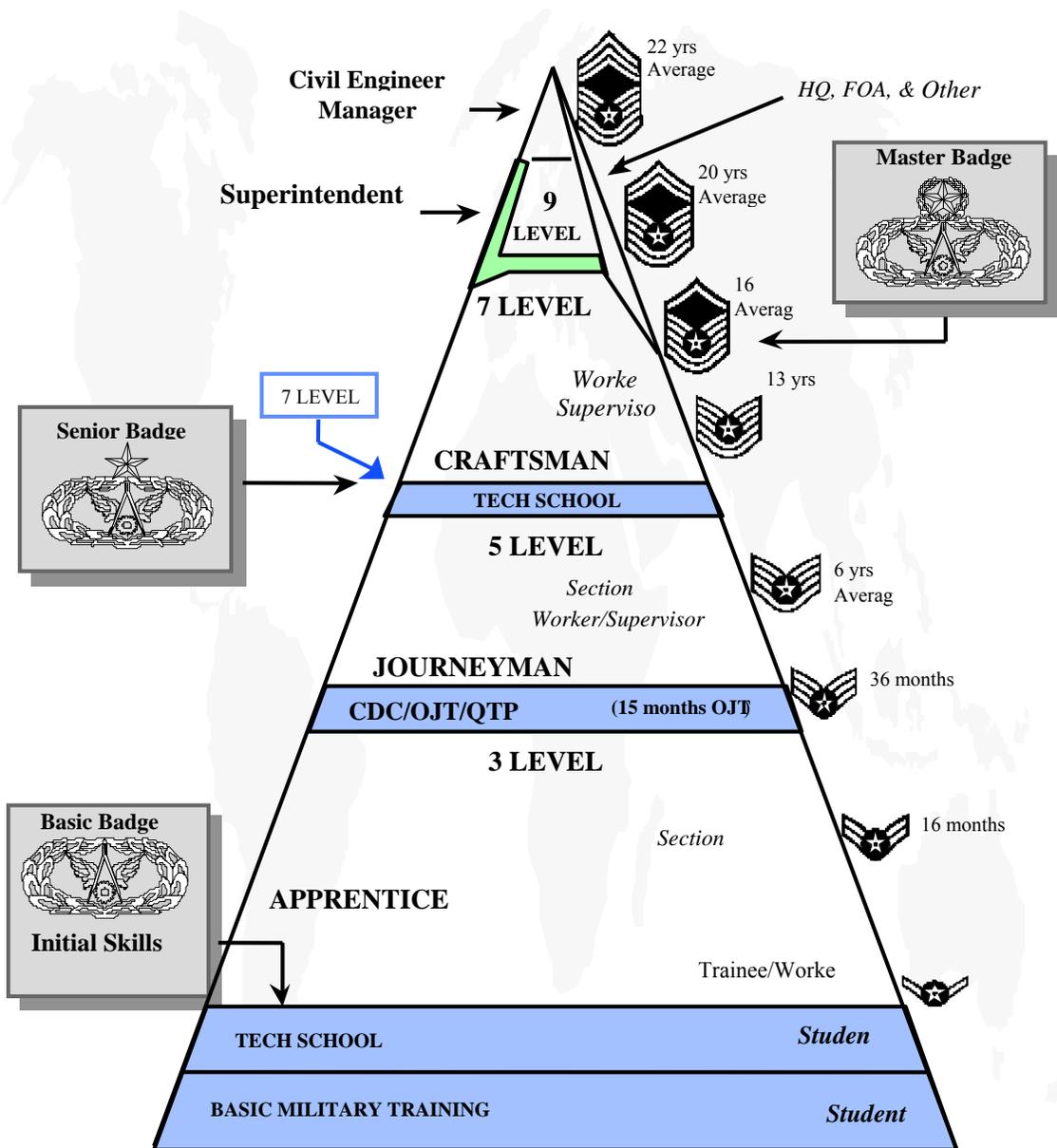
Oral Communication	3
Speech	
Written Communication	3
English Composition	
Mathematics	3
An intermediate algebra or college-level mathematics course that satisfies the delivering institution's mathematics requirement for graduation. If an acceptable mathematics course is applied as a Technical or Program Elective, a natural science course may be substituted for mathematics.	
Social Science	3
Anthropology, Archaeology, Economics, Geography, Government, History, Political Science, Psychology, Sociology	
Humanities	3
Fine Arts (criticism, appreciation, historical significance), foreign language, literature, philosophy, religion	

8.3.6. Program Elective (15 Semester Hours): Satisfied with applicable technical education, Leadership, Management, and Military Studies (LMMS), or general education requirements; Natural science courses meeting the general education requirement application criteria; Foreign language credit earned at Defense Language Institute or through Defense Language Proficiency Test; Maximum of six semester hours of CCAF degree-applicable technical course credit otherwise not applicable to this program may be applied. See the *CCAF General Catalog* for details regarding the Associates of Applied Sciences degree for this specialty.

8.4. Additional off-duty education is a personal choice that is encouraged for all. Individuals desiring to become an AETC Instructor should be actively pursuing an associate degree. A degreed faculty is necessary to maintain accreditation through the Southern Association of Colleges and Schools.

9. Career Field Path. The following chart depicts this specialty's career path.

HVAC/R Enlisted Career Pyramid



9.1. Enlisted Career Path

Table: Enlisted Career Path				
Education and Training Requirements	GRADE REQUIREMENTS			
	Rank	Average Sew-On	Earliest Sew-On	High Year Of Tenure (HYT)
Basic Military Training school				
Apprentice Technical School (3-Skill Level)	Amn A1C	6 months 16 months		
Upgrade To Journeyman (5-Skill Level) -- Complete all core and duty-related tasks identified in CFETP. - Minimum 15 months on-the-job training (9 months for retrainees) - Complete appropriate CDC if/when available.	SRA	3 years	28 months (22 months for Below-The Zone)	12 Years
Airman Leadership School - Must be a SrA with 48 months time in service or be a SSgt Selectee. - Resident graduation is a prerequisite for SSgt sew-on (Active Duty Only).	Trainer			
	- Must be qualified and certified to perform the tasks to be trained. - Must attend formal OJT Trainer Training.			
Upgrade To Craftsman (7-Skill Level) - Minimum rank of SSgt. - 12 months OJT (6 months for retrainees) - Complete 7-level Craftsman Course. - Complete all core and duty related tasks identified in CFETP	SSgt	7.5 years	3 years	20 Years
	Certifier			
	- SSgt with 5-skill level or civilian equivalent. - Attend formal OJT Certifier Course. - Be a person other than the trainer (for core and critical tasks only).			
Noncommissioned Officer Academy - Must be a TSgt or TSgt Selectee. - Resident graduation is a prerequisite for MSgt sew-on (Active Duty Only).	TSgt MSgt	12.5 years 16 years	5 years 8 years	24 Years 26 Years
USAF Senior NCO Academy - Must be a SMSgt, SMSgt selectee, or selected MSgt - Resident graduation is a prerequisite for CMSgt sew-on (Active Duty Only)				28 Years
Upgrade To Superintendent (9-Skill Level) - Minimum rank of SMSgt. - Complete AFIT WMGT 570, Civil Engineer Superintendent Course.	SMSgt	19.2 years	11 years	
Civil Engineer Manager (CEM) - Completion of Chief Leadership course is Mandatory	CMSgt	21.5 years	14 years	30 Years

9.2. CE Occupational Badge. The Civil Engineer badge reflects a great history and tradition. By wearing it, you will be recognized by your fellow Airmen as having achieved an expected level of competence. The multitude of engineers before you established this expectation through excellent service in both peace and war. Eligibility criteria for award and wear of AF occupational badges can be found in AFI 36-2923, *Aeronautical, Duty, and Occupational Badges*.



Master

Worn as a master sergeant or above with 5 years in the specialty from award of the 7-skill level



Basic

Worn upon completion of technical school



Senior

Worn after award of the 7-skill level

CE Badge Heraldry

The gear wheel and compass have historically been used to represent the engineering profession, in both the military and civilian sector. The gear represents the essence of engineering: applying scientific principles and technology to practical ends. To Air Force engineers, the gear symbolizes an element (representing the built environment) that meshes with other environments (weapon systems and trained personnel) to enable the Air Force to perform its mission. The compass is a precision tool historically used by engineers in designing and constructing facilities and equipment. The gear and compass together symbolize all the diverse specialties within Air Force Civil Engineer. Finally, the wings help to portray the fundamental linkage between the engineering and aviation components; and that the built environment is the foundation supporting Air Force mission and people.

SECTION C - SKILL LEVEL TRAINING REQUIREMENTS

10. Purpose. The various skill levels in the career field are defined in terms of tasks and knowledge requirements for the HVAC/R career ladder. They are stated in broad, general terms and establish the standards of performance. An all-encompassing core task list has been developed for this specialty because of the diversity of the missions supported and the equipment installed to meet mission requirements. Core tasks (and diamond tasks as applicable), knowledge items, and skill requirements for this specialty are identified in the STS. Completion of the mandatory 3-level awarding course, the mandatory completion of CDCs, the mandatory completion of applicable AFQTPs and CerTests, and the mandatory 7-level Craftsman course, comprise Air Force requirements.

11. Specialty Qualification.

11.1. Apprentice (3-Level) Training Requirements.

11.1.1. Specialty Qualification.

11.1.1.1. Knowledge. Completion of the HVAC/R Apprentice course satisfies these requirements.

11.1.1.2. Education. Completion of high school or General Education Development (GED) with courses in mathematics, general science, physics, shop mechanics, electricity and computer fundamentals is desirable.

11.1.1.3. Training. Completion of the HVAC/R Apprentice course is mandatory for award of this skill level.

11.1.1.4. Experience. N/A

11.1.1.5. Other.

11.1.1.5.1. Normal color vision as defined in AFI 48-123, *Medical Examination and Standards*, is mandatory for entry into AFSC.

11.1.1.5.1. Qualification to operate government vehicles according to AFMAN 24-301, Vehicle Operations.

11.1.2. Training Sources and Resources.

11.1.2.1. Formal training is accomplished through the HVAC/R Apprentice course at Sheppard AFB, TX.

11.1.2.2. The Course Objective List (COL) (Part II, Section B of this CFETP) identifies all the knowledge and tasks, with their respective standards.

11.1.2.3. When available, AFQTPs and associated CerTests are mandatory for use during UGT/QT on all core tasks, critical tasks, and diamond (◆) tasks.

11.1.3. Implementation.

11.1.3.1. The 3-skill level is awarded upon graduating the HVAC/R Apprentice course along with completion of the common-core training.

11.2. Journeyman (5-Level) Training Requirements.

11.2.1. Specialty Qualification.

11.2.1.1. Knowledge. Principles of HVAC/R systems, controls and components, combustion systems, air and water balancing, non-electric kitchen equipment, industrial air compressors, interpreting drawings and schematics and fundamentals of HVAC/R equipment and troubleshooting techniques are all required knowledge.

11.2.1.2. Education. N/A

11.2.1.3. Training. The following training is mandatory for award of the 5-skill level:

11.2.1.3.1. Completion of 5-skill level CDCs.

11.2.1.3.2. Certification of all 5-level core tasks identified with a single asterisk (*) in the 5-level core task column of the STS.

11.2.1.3.3. Completion of AFQTPs for assigned core tasks and diamond (◆) tasks.

11.2.1.3.4. Completion of CerTests for all diamond (◆) tasks with a minimum of 80%.

11.2.1.3.5. Certification of duty position requirements identified by the supervisor.

11.2.1.3.6. The following training is desirable and strongly encouraged:

11.2.1.3.6.1. Completion of the HVAC/R Control Systems course (when available).

11.2.1.3.6.2. Completion of the Advanced Air Conditioning and Refrigeration Systems course (when available).

11.2.1.4. Experience.

11.2.1.4.1. Qualification in and possession of 3-skill level.

11.2.1.4.2. Operation, maintenance and repair of HVAC/R equipment and control systems.

11.2.1.4.3. Minimum 15 months on-the-job training (9 months for re-trainees).

11.2.1.5. Other. N/A

11.2.2. Training Sources and Resources.

11.2.2.1. CDC 3E151, HVAC/R Journeyman.

11.2.2.2. HVAC/R Control Systems course (when available).

11.2.2.3. Advanced Air Conditioning and Refrigeration Systems course (when available).

11.2.2.4. The STS (Part II, Section A of the CFETP) identifies all core tasks required for qualification in the individual's duty position.

11.2.2.5. Qualified trainers provide upgrade and qualification training for duty positions, managed programs, and/or equipment to be used.

11.2.3. Implementation. Entry into 5-level upgrade training is initiated after the trainee completes the 3-level school and is assigned to his or her first duty station. Also, qualification training is initiated any time individuals are assigned duties they are not certified to perform. AFQTPs are used concurrently to obtain necessary duty position qualifications.

11.3. Craftsman (7-Level) Training Requirements.

11.3.1. Specialty Qualification.

11.3.1.1. Knowledge. Knowledge of the following areas is mandatory: Thermodynamics, psychrometrics and associate mathematics, industrial water treatment, environmental regulations for fuels, refrigerants and hazardous materials, and both military and commercial publications.

11.3.1.2. Education.

11.3.1.2.1. Completion of the CE 7-level Common Core Distance Learning Module is mandatory.

11.3.1.2.2. To assume the rank of SSgt, individuals must successfully complete Airman Leadership School (active duty only).

11.3.1.2.3. To assume the rank of MSgt, individuals must successfully complete the NCO Academy (active duty only).

11.3.1.2.4. For ANG/AFRC, completion of Air Force Institute for Advanced Distributive Learning (AFIADL) courses 00001 (ALS) and 00006 D&E (NCO Academy) satisfy rank prerequisites.

11.3.1.3. Training. The following training is mandatory for award of the 7-skill level:

11.3.1.3.1. Completion of in-residence HVAC/R Craftsman Course is mandatory.

11.3.1.3.2. Certification of all 5 and 7-skill level core tasks identified with a single asterisk (*) in the 5 and 7-skill level core task columns of the STS.

11.3.1.3.3. Completion of all AFQTPs for assigned core and diamond (◆) tasks

11.3.1.3.4. Completion of CerTests for all diamond (◆) tasks with a minimum of 80%.

11.3.1.3.5. Certification of duty position requirements identified by the supervisor.

11.3.1.3.6. Completion of any/all of the following advanced courses is highly desirable:

11.3.1.3.6.1. HVAC/R Control Systems Course (when available)

11.3.1.3.6.2. Advanced Air Conditioning and Refrigeration Systems Course (when available)

11.3.1.4. Experience.

11.3.1.4.1. Qualification in and possession of a 5-level

11.3.1.4.2. Must be SSgt with minimum 12 months on-the-job training (6 months for re-trainees).

11.3.1.5. Other. N/A.

11.3.2. Training Sources and Resources.

11.3.2.1. HVAC/R Craftsman Course .

11.3.2.2. The STS (Part II, Section A of this CFETP) identifies all core tasks required for qualification in the individual's duty position.

11.3.2.3. Qualified trainers provide upgrade and qualification training for duty positions, managed programs, and/or equipment to be used.

11.3.2.4. NCO Academy Course (correspondence).

11.3.2.5. HVAC/R Control Systems Course (when available).

11.3.2.6. Advanced Air Conditioning and Refrigeration Course (when available).

11.3.3. Implementation. Entry into 7-level training is initiated when an individual is selected for SSgt and has fulfilled all 5-level requirements. Qualification training is initiated any time an individual is assigned duties that they are not certified to perform. AFQTPs are used concurrently to obtain necessary duty position qualifications.

11.4. Superintendent (9-Level) Training Requirements.

11.4.1. Specialty Qualification.

11.4.1.1. Knowledge. Knowledge is mandatory of Air Force training programs, CE policies, practices, and procedures of base maintenance and operations, crafts, facilities, equipment, and systems. Additionally, knowledge is mandatory of HVAC/R electrical, electronic and pneumatic control systems, interpretations and applications of wiring schematics, diagrams, maintenance, work force management, safety and environmental concerns.

11.4.1.2. Education.

11.4.1.2.1. Completion of Senior NCO Academy is mandatory prior to award of 9-skill level.

11.4.1.2.2. ANG/AFRC must complete AFIADL course 00012 (computer base CD-ROM) or in-residence Senior NCO Academy course prior to award of the 9-skill level.

11.4.1.2.3. Completion of AFIT WMGT Civil Engineer Superintendent course is mandatory prior to award of 9-skill level.

11.4.1.3. Training. Completion of duty position training requirements is mandatory.

11.4.1.4. Experience.

11.4.1.4.1. Qualification in and possession of 7-skill level is mandatory.

11.4.1.4.2. Minimum rank of SMSgt with experience directing functions such as inspecting, operating, maintaining and repairing HVAC/R systems.

11.4.1.5. Other. N/A

11.4.2. Training Sources and Resources.

11.4.2.1. In-residence Senior NCO Academy located at Maxwell AFB - Gunter Annex AL.

11.4.2.2. Senior NCO Academy Course 00012 (exportable computer based CD-ROM).

11.4.2.3. Civil Engineer Superintendent Course, WMGT 570, conducted at AFIT, Wright-Patterson AFB, OH.

11.4.3. Implementation.

11.4.3.1. Entry into 9-level training is initiated when an individual is selected for SMSgt and is a fully qualified 7-Level. Qualification training is initiated any time an individual is assigned duties they are not certified to perform.

11.5. Civil Engineer Manager.

11.5.1. Specialty Qualification.

11.5.1.1. Knowledge. Knowledge is mandatory of managing and directing personnel resource activities, interpreting and enforcing policy and applicable directives, establishing control procedures to meet work goals and standards, recommending or initiating actions to improve operational efficiency, planning and programming work commitments and schedules, and developing plans regarding facilities, supplies, and equipment procurement and maintenance.

11.5.1.2. Education. Must be a resident graduate of Senior NCO Academy (active duty only). Completion of the Chief Leadership Course is mandatory.

11.5.1.3. Training. N/A

11.5.1.4. Experience. Possess qualifications in feeder specialty (3E191) prior to award of Civil Engineer Manager Code 3E000. Individual must possess the managerial ability to plan, direct, coordinate, implement and control a wide range of work activity.

11.5.1.5. Other. N/A

11.5.2. Training Sources and Resources. N/A

11.5.3. Implementation. Entry into Civil Engineer Manager Code 3E000 is initiated when an individual is selected for CMSgt and possesses qualifications in a feeder specialty (3E090, 3E191, 3E291, 3E391, 3E490, 3E591, and 3E691).

SECTION D - RESOURCE CONSTRAINTS

12. Purpose. This section identifies known resource constraints, which preclude optimal and desired training from being developed or conducted, including information such as cost and manpower. Narrative explanations of each resource constraint and an impact statement describing what effect each constraint has on training are included. Also included in this section are actions required, office of primary responsibility, and target completion dates. Resource constraints will be, as a minimum, reviewed and updated annually.

12.1 Equipment Constraints:

12.1.1. Constraints: New equipment is required due to course revisions identified at the 2005 TPT based on changes to training standards.

12.1.2. Time/Manpower/Student Man-years Constraints: None.

13. Apprentice (3-Level) Training: This course is in the final stages of development/revision. Per the approved Course Resource Estimate (CRE), funding has been provided for the following equipment requirements: one water chiller, 15 clamp-on meters, 110 multimeter kits, one HAZCOM, PPE and safety video set, 16 vacuum gauge meters, one soot powder vacuum, 16 refrigerant charging scales, four ADR 300 refrigeration units, 14 printed circuit boards (N.9.2.) and a field water heater (M-80). Manpower authorizations should be transferred from the existing HVAC/R apprentice course to the new course.

14. Journeyman (5-Level) Training. The HVAC/R Control Systems course and Advanced Air Conditioning and Refrigeration Systems course are both in development/revision. They're being designed to replace the three existing HVAC/R advanced 5-level courses. Minimal new equipment should be required for these two new courses. The CREs will list specific resource information. Manpower authorizations will be identified in the future for these two new courses.

15. Craftsman (7-level) Level Training. None.

16. Superintendent (9-Level) Training. None.

SECTION E – TRANSITIONAL TRAINING GUIDE

17. There are currently no transition training requirements. This area is reserved.

PART II

SECTION A - SPECIALTY TRAINING STANDARD

1. Implementation. This STS will be used for technical training provided by AETC for the 3-level HVAC/R Apprentice Course with the class beginning 10 Aug 07 and graduating 10 Jan 08.

2. Purpose. As prescribed in AFI 36-2201v5, *Air Force Training Program, Career Field Education and Training*, this STS:

2.1. Lists in Column 1 (*Tasks, Knowledge, and Technical References*) the most common tasks, knowledge, and Technical References (TR) necessary for Airmen to perform duties in the 3-, 5-, and 7-skill level.

2.2. Column 2 (*Core Tasks*) identifies core tasks (specialty-wide training requirements) by an asterisk (*) in the 5 and/or 7-skill level column(s). **As a minimum, trainees must complete hands-on certification on all core and critical tasks for skill-level upgrade.**

2.2.1. All tasks in the 3-level course column are considered wartime tasks. Consequently, in response to a wartime scenario, these tasks will be taught in the 3-level course in a streamlined training environment.

2.2.2. Tasks identified by a diamond (◆) in column 2 are considered contingency tasks for both the 5- and 7-skill level and are extremely important to the career field. However, equipment shortfalls at most locations have created problems with the actual hands-on certification of these tasks. In instances where required equipment is not available for instruction, completion of the task's AFQTP and passing the corresponding CerTest is all that is required for upgrade and qualification training.

2.3. Provides **certification for OJT**. Column 3 is used to record completion of task and knowledge training requirements. The CE CFM's approved automated training record AFTR (*Air Force Training Record*) must be used to document technician qualifications. **Task certification** must show training start and completion dates along with initials of the trainee, trainer, and certifier. All non-core tasks require training completion date and initials of the trainee and trainer only.

2.4. Shows **formal training and correspondence course** requirements. Column 4 shows the proficiency the graduate must demonstrate on the job. The training and knowledge for column 4 tasks were accomplished in both the initial skills course and correspondence course. In addition, Airmen can view the CADRE/AFSC/CDC listing maintained by the unit education and training manager for current CDC listings.

2.5. Identifies **qualitative requirements**. **Attachment 1** contains the proficiency code key used to indicate the level of training and knowledge provided by resident training and career development courses.

2.6. Becomes a **Job Qualification Standard (JQS)** for on-the-job training when placed in AF Form 623, Individual Training Record, and used according to AFI 36-2201v3, *Air Force Training Program on Job Training Administration* and/or AFI 36-2201v5, *Air Force Training Program, Career Field Education and Training*. For OJT, the tasks in Column 1 are trained and qualified to the go/no go level. Go means the individual can perform the task without assistance and meets local requirements for accuracy, timeliness, and correct use of procedures. AFQTPs, when available, shall be used to identify Air Force standardized procedures. When used as a JQS, the following requirements apply:

2.6.1. Documentation. Document and certify completion of training.

2.6.1.1. Identify **current duty position requirements** by circling the subparagraph number or letter next to the task statement. Additionally, all core (*) and diamond (◆) identified tasks should be circled. Document task completion by annotating columns 3A, 3B, 3C, 3D and 3E, as appropriate.

NOTE: All entries shall be made in pencil.

2.6.1.2. Enter the start date of the AFQTP on the AFQTP documentation record. Once completed enter the completion date. When **hands-on** training is started and completed, annotate the STS accordingly.

2.6.1.3. Transcribing from old document (paper or automated) to CFETP. Use the new STS to identify and certify all current and past task qualifications.

2.6.1.3.1. For tasks previously certified and still required in the current duty position, circle the subparagraph number next to the task statement and enter the current date in the completion column. Trainee initials in the trainee column and the current task certifier or supervisor/trainer initials in the trainer column.

2.6.1.3.2. For tasks previously certified but not required in the current duty position (do not circle), transcribe only the previous certification dates (no initials). If the task later becomes required in the duty position, recertify using current dates and initials.

2.6.1.3.3. Annotate the AF Form 623a, (for example, “I certify the information contained in the CFETP dated XX was transcribed to the CFETP dated XX, and the trainee was given the superseded CFETP.” Signed and dated by the supervisor and trainee).

2.6.1.4. Documenting Career Knowledge. When a CDC is not available, the supervisor identifies STS training references that the trainee requires for career knowledge IAW AFI 36-2201v3, *Air Force Training Program on Job Training Administration*, and ensures, as a minimum, that trainees cover all mandatory items specified within the Enlisted Classification Directory. For two-time CDC exam failures, the unit commander will take appropriate action IAW AFI 36-2201v3, *Air Force Training Program on Job Training Administration*,. **NOTE:** Career knowledge must be documented prior to submitting a CDC waiver.

2.6.1.5. Decertification and Desertification. Once verified that an Airman is unqualified on a task, the supervisor must erase previous certification date and enter the Airman into qualification training. The reason for decertification is annotated on the AF Form 623a (On-The-Job Training Record Continuation Sheet). After the trainee demonstrates competence, use the normal certification process to recertify the individual.

2.7. The STS also serves as a development guide for promotion tests used in the Weighted Airman Promotion System (WAPS). Senior NCOs with extensive practical experience in their career fields develop specialty Knowledge Tests (SKTs) at the USAF Occupational Measurement Squadron. The objective of these tests is to sample one's STS knowledge. Working off this premise, the test development team unanimously determined the appropriate subject matter areas for promotion to higher grades. Note: Test questions stem from study references listed in the WAPS catalog. Individual responsibilities are in chapter 14 of AFI 36-2606, *United States Air Force Reenlistment, Retention, and NCO Status Programs*. WAPS is not applicable to the Air National Guard or Air Reserve Forces.

3. Recommendations. AETC welcomes comments and recommendations concerning the quality of training AETC graduates receive. Reference specific STS paragraphs and address correspondence regarding changes to 782 TRG/TGAV, 620 9th Avenue, Suite 3, Sheppard AFB TX 76311-2268. For supervisor's convenience, a Customer Service Information Line (CSIL) has been installed to expedite feedback on graduates who may have received over or under training on task/knowledge items listed in this training standard. For a quick response to problems, call our CSIL at DSN: 736-2574 or e-mail csil@sheppard.af.mil any time day or night.

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

DEL EUBAUGH, Maj Gen, USAF
The Civil Engineer
DCS/Installations and Logistics

3 Attachments

1. Qualitative Requirements
2. 3-, 5-, and 7-level career field training requirements
3. AFQTP Documentation record

<i>This Block Is For Identification Purposes Only</i>		
Name Of Trainee		
Printed Name (Last, First, Middle Initial)	Initials (Written)	SSAN
Printed Name Of Certifying Official And Written Initials		
<i>N/I</i>	<i>N/I</i>	

QUALITATIVE REQUIREMENTS

Proficiency Code Key		
	Scale Value	Definition: The individual
Task Performance Levels	1	Can do simple parts of the task. Needs to be told or shown how to do most of the task. (Extremely Limited)
	2	Can do most parts of the task. Needs only help on hardest parts. (Partially Proficient)
	3	Can do all parts of the task. Needs only a spot check of completed work. (Competent)
	4	Can do the complete task quickly and accurately. Can tell or show others how to do the task. (Highly Proficient)
*Task Knowledge Levels	a	Can name parts, tools, and simple facts about the task. (Nomenclature)
	b	Can determine step by step procedures for doing the task. (Procedures)
	c	Can identify why and when the task must be done and why each step is needed. (Operating Principles)
	d	Can predict, isolate, and resolve problems about the task. (Advanced Theory)
**Subject Knowledge Levels	A	Can identify basic facts and terms about the subject. (Facts)
	B	Can identify relationship of basic facts and state general principles about the subject. (Principles)
	C	Can analyze facts and principles and draw conclusions about the subject. (Analysis)
	D	Can evaluate conditions and make proper decisions about the subject. (Evaluation)
<p>Explanations</p> <p>* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Example: b and 1b)</p> <p>** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.</p> <p>- This mark is used alone instead of a scale value to show that no proficiency training is provided in the course or CDC.</p> <p>X This mark is used alone in the course columns to show that training is required but not given due to limitations in resources.</p> <p>NOTE: All tasks and knowledge items shown with a proficiency code are trained during war time.</p>		

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
1. CE ORGANIZATION AND CAREER FIELD STRUCTURE TR: AFDD 2-4-2; AFIs 10-209, 10-210,10-211, 32-1022, 36-2101, 38-101, 51-903; Enlisted Classification Directory; AF PAM 32-1004 Vol 1-6; War Mobilization Plan (WMP) 1, Annex S									-	-	-	-	-	-
1.1. Civil Engineer (CE) Structure									-	A	-	B	-	-
1.2. Progression in Career Ladder									-	A	-	B	-	-
1.3. Duties and Responsibilities									-	-	-	-	-	-
1.3.1. Peacetime									-	A	-	B	-	-
1.3.2. Contingency									-	A	-	B	-	-
1.4. Functions of:									-	-	-	-	-	-
1.4.1. Base Civil Engineer (BCE)									-	A	-	B	-	-
1.4.2. Prime BEEF									-	A	-	B	-	-
1.4.3. RED HORSE									-	A	-	B	-	-
1.4.4. HQ Air National Guard (ANG) Air Force Reserve Command (AFRC)									-	A	-	B	-	-
1.4.5. HQ Air Force Civil Engineer Support Agency (AFCESA)									-	-	-	A	-	B
1.4.6. HQ Air Force Center For Environmental Excellence (AFCEE)									-	-	-	-	-	A
1.4.7. Air Force Institute of Technology (AFIT)									-	-	-	-	-	A
1.4.8. Air Force Research Laboratory (AFRL)									-	-	-	-	-	A
1.5. Resources									-	-	-	-	-	-
1.5.1. Assess manpower requirements									-	-	-	-	-	b
1.5.2. Identify budget requirements									-	-	-	-	-	b
1.5.3. Determine equipment requirements									-	-	-	-	-	b
1.5.4. Use Allowance Standards (AS)									-	-	-	-	-	b
1.5.5 Research, Development, and Acquisition (RD&A) TR: DoDD 5000.1									-	-	-	-	-	-
1.5.5.1 Process									-	-	-	-	-	B
1.5.5.2 Unit Responsibilities									-	-	-	-	-	B
1.5.5.3 Major Command Responsibilities									-	-	-	-	-	B
1.5.6 Assess vehicle requirements									-	-	-	-	-	b
1.5.7 Requesting contract services									-	-	-	-	-	b
1.5.8 Requesting Simplified Acquisition of Base Engineering Requirements (SABER) contract									-	-	-	-	-	B
1.5.9 Geo Base Technologies									-	-	-	B	-	B
1.5.10 Quality Assurance Personnel (QAP) duties TR: Federal Acquisition Regulation Part 37.6; AFI 63-124; AFPAM 32-1004 v2									-	-	-	-	-	-
1.5.10.1 Evaluate contractor's performance									-	-	-	-	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
1.5.10.2 Document contractor's performance									-	-	-	-	-	-
1.5.10.3 Maintain surveillance documentation									-	-	-	-	-	-
2 SUPERVISION TR: AFIs 36-2201, 36-2403, 36-3104; Enlisted Classification Directory; AFPAM 36-3627; AFP 35-49; DoDD 5500-7									-	-	-	-	-	-
2.1 Orient new personnel									-	-	-	-	-	b
2.2 Assign personnel to work crew									-	-	-	-	-	b
2.3 Coordinate work assignments									-	-	-	-	-	b
2.4 Schedule work assignments and priorities									-	-	-	-	-	b
2.5 Establish:									-	-	-	-	-	-
2.5.1 Work Methods									-	-	-	-	-	b
2.5.2 Controls									-	-	-	-	-	b
2.5.3 Performance Standards									-	-	-	-	-	b
2.6 Evaluate work performance of subordinate personnel									-	-	-	-	-	b
2.7 Resolve technical problems for subordinate personnel									-	-	-	-	-	b
2.8 Direct projects									-	-	-	-	-	b
3 TRAINING TR: AFIs 36-2101, 36-2201, 36-2202; Enlisted Classification Directory; AF Education & Training Course Announcements (ETCA)									-	-	-	-	-	-
3.1 Evaluate personnel to determine need for training									-	-	-	a	-	b
3.2 Enlisted Specialty Training Supervision									-	-	-	-	-	-
3.2.1 Prepare job qualification standards									-	-	-	a	-	b
3.2.2 Conduct training									-	-	-	a	-	b
3.2.3 Counsel trainees on their progress									-	-	-	a	-	b
3.2.4 Monitor Training Effectiveness of:									-	-	-	-	-	-
3.2.4.1 Career knowledge									-	-	-	a	-	b
3.2.4.2 Job proficiency upgrade									-	-	-	a	-	b
3.2.4.3 Qualification									-	-	-	a	-	b
3.3 Maintain training records									-	-	-	a	-	b
3.4 Evaluate training programs effectiveness									-	-	-	a	-	b
3.5 Recommend people for training									-	-	-	a	-	b
3.6 AETC Training Management System (Training Allocation)									-	-	-	A	-	B
3.7 Managing Certification and Testing (CerTest)									-	-	-	A	-	B
3.8 National/DoD Certification requirements									-	-	-	A	-	B
3.9 Air Force Quality Training Package (AFQTP) Requirements									-	-	-	A	-	B

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A		B		C	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
4 ENVIRONMENTAL AWARENESS AND COMPLIANCE TR: AFIs 32-4002, 32-7045, 32-7061; Chemicals in Your Community (EPA 550-K-93-003); EO 12856									-	-	-	-	-	-
4.1 Environmental Compliance (ECAMP, ESOH)									-	-	-	A	-	B
4.2 Environmental Protection Agency (EPA)									-	-	-	A	-	B
5 CE MANAGEMENT TR: AFIs 32-1022, 32-1031; AFPAM 32-1098; AFMAN 23-110									-	-	-	-	-	-
5.1 Customer relationships										A	-	B	-	-
5.2 Work identification and authorization									-	-	-	A	-	B
5.3 Plan work requirements									-	-	-	A	-	B
5.4 Plan logistics support (CEMAS, BOM)									-	-	-	A	-	B
5.5 Government Purchase Care (GPC) Program									-	-	-	A	-	B
5.6 Maintain Recurring Work Program (RWP)									-	-	-	A	-	B
5.7 Scheduling/time accounting									-	-	-	A	-	B
5.8 Warranty/Guarantee Program									-	-	-	A	-	B
5.9 Property Accountability										-	-	A	-	B
5.10 Air Force Comprehensive Plan									-	-	-	A	-	B
5.11 Legal limits									-	-	-	A	-	B
5.12 Mark "As Built" Drawings									-	-	-	A	-	B
5.13 Reimbursements procedures									-	-	-	A	-	B
5.14 CE Specific Automated Systems (Computer) Capability									-	-	-	-	-	-
5.14.1 Perform inputs									-	-	-	a	-	b
5.14.2 Maintain files									-	-	-	a	-	b
5.14.3 Develop automated reports									-	-	-	a	-	b
5.14.4 Extract automated reports									-	-	-	a	-	b
5.14.5 Perform automated data analysis									-	-	-	-	-	b
5.15 Host Tenant and Interservice Agreements									-	-	-	-	-	A
5.16 Civil Engineer Civilian Management									-	-	-	-	-	B
6 AF OCCUPATIONAL SAFETY AND HEALTH (AFOSH) PROGRAM TR: AFOSH STDs 91-301, 91-302, 91-501									-	-	-	-	-	-
6.1 Supervisory responsibilities									-	-	-	B	-	-
6.2 Hazardous materials/waste handling									A	-	-	B	-	-
6.3 Lead-based paint (LBP) hazard TR: 29 CFR 1926.62; Working With Lead-based Paint: Facts and Information Applicable to Air Force Facilities									A	-	-	B	-	-
6.4 Asbestos awareness									A	-	-	B	-	-
7 PUBLICATIONS									-	-	-	-	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A		B		C	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
7.1 Military									A	-	-	B	-	-
7.2 Commercial									A	-	-	B	-	-
7.3 Engineering Technical Letters (ETL)									-	-	-	A	-	B
8 AFS CONVENTIONAL TASKS AND STANDARDS TR: AFIs 90-821, 91-302; AFOSHSTD 91-501; DOD 6050.5 G-1									-	-	-	-	-	-
8.1 AFOSH Training Standards									-	-	-	-	-	-
8.1.1 AFOSH Training/Standards/Hazards for AFS									A		-	B	-	-
8.1.2 Initial Federal Hazard Communication Training Program (FHCTP)									A		-	-	-	-
8.1.3 Individual responsibilities									A		-	B	-	-
8.1.4 Apply safety practices when working with:									-	-	-	-	-	-
8.1.4.1 Electrical equipment									2b		-	b	-	-
8.1.4.2 Mechanical equipment									2b		-	b	-	-
8.1.4.3 Hazardous noise									2b		-	b	-	-
8.1.4.4 Flammables									2b		-	b	-	-
8.1.4.5 Chemicals/Acids									a		-	b	-	-
8.1.4.6 Refrigerants									2b		-	b	-	-
8.1.4.7 Steam									2b		-	b	-	-
8.1.4.8 Hot Water									2b		-	b	-	-
8.1.4.9 Air pressure									2b		-	b	-	-
8.1.4.10 Asbestos									a		-	b	-	-
8.1.5 Apply first aid procedures for:									-	-	-	-	-	-
8.1.5.1 Electrical shock									b		-	b	-	-
8.1.5.2 Burns									a		-	b	-	-
8.1.6 Perform cardiopulmonary resuscitation (CPR)									2b	-	-	-	-	-
8.1.7 Backflow prevention to protect potable water supplies									A		-	B	-	-
8.1.8 Manual lifting awareness									A		-	B	-	-
8.1.9 Identification of hazardous piping									A		-	B	-	-
8.2 AFS SPECIFIC PUBLICATIONS TR: TO 00-5-1, TO 00-5-18, http://www.e-publishing.af.mil/orgs.asp?type=pubs									-	-	-	-	-	-
8.2.1 Technical Orders									A		-	B	-	-
8.2.2 Instructions, Regulations, Pamphlets, and Manuals									A		-	B	-	-
8.2.3 National Electric Code (NFPA 70)									A		-	B	-	-
8.2.4 National Electric Safety Code									A		-	B	-	-
8.2.5 ASHRAE Manuals									-		-	B	-	-
8.2.6 ASME Codes									-		-	B	-	-
8.2.7 Manufacturers Manuals									-		-	B	-	-
8.2.8 Use publications to perform maintenance, operations, and troubleshooting									1a		-	b	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A		B		C	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
8.2.9 Use indexes to locate numbers and titles of instructions, manuals, regulations, technical orders, and forms									1a		-	b	-	-
8.3 TOOLS & TEST EQUIPMENT TR: AFI 32-1064; TOs 32-1-101, 33A1-12-2-1									-	-	-	-	-	-
8.3.1 Maintain and use tools (hand and powered)									2b		-	b	-	-
8.3.2 Maintain and use precision measuring instruments									1a		-	b	-	-
8.3.3 Maintain and use electrical test equipment									-	-	-	-	-	-
8.3.3.1 Digital Multimeter									2b		-	b	-	-
8.3.3.2 Analog Multimeter									2b		-	b	-	-
8.3.3.3 Ammeter									2b		-	b	-	-
9 PIPING/TUBING TR: TOs 34W4-1-5, 34W4-1-8									-	-	-	-	-	-
9.1 Types & sizes									B		-	B	-	-
9.2 Fittings									B		-	B	-	-
9.3 Piping systems fabrication											-	-	-	-
9.3.1 Fabricate piping and tubing systems		*	*						2b		-	b	-	-
9.3.2 Install piping and tubing systems		*	*						2b		-	b	-	-
9.4 Types and operation of valves									A		-	B	-	-
9.5 Interpret system drawings									2b		-	b	-	-
10 WELDING & CUTTING TR: TOs 32-1-101, 32-1-151, 34W4-1-5, 34W4-1-8, 42D-1-3									-	-	-	-	-	-
10.1 Theory of operation											-	-	-	-
10.1.1 Acetylene equipment (air and hydrocarbon)									B		-	B	-	-
10.1.2 Oxyacetylene equipment									B		-	B	-	-
10.2 Use equipment									-	-	-	-	-	-
10.2.1 Cut									a		-	b	-	-
10.2.2 Braze and solder		*	*						2b		-	b	-	-
10.3 Maintain equipment									b		-	b	-	-
11 HVAC/R PHYSICS TR: Environmental Systems Technologies 2nd Ed; Principles of Refrigeration 5th Ed									-	-	-	-	-	-
11.1 Structure of matter									A		-	B	-	-
11.2 Energy (Stored, Nonstored, Conversion)									A		-	B	-	-
11.3 Laws of thermodynamics									A	-	-	B	-	-
11.4 Heat flow (Energy, Measurement, Transfer)									A	-	-	B	-	-
11.5 Fluid flow (Properties, Statics, Dynamics)									A	-	-	B	-	-
11.6 Psychrometrics										-	-		-	-
11.6.1 Properties of air									A	-	-	B	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
11.6.2 Air-vapor relationship									A	-	-	B	-	-
11.6.3 Psychrometric Chart									-	-	-	-	-	-
11.6.3.1 Terms									A	-	-	B	-	-
11.6.3.2 Plotting properties of air									1a	-	-	b	-	-
11.6.3.3 Psychrometric processes									-	-	-	-	-	-
11.6.3.3.1 Plot processes of conditioned air									1a	-	-	b	-	-
11.6.3.3.2 Interpretation of plotted processes									A	-	-	B	-	-
12 AIR and HYDRONIC SYSTEMS TR: Environmental Systems Technology 2nd Ed; Trane Air Conditioning Manual; Principles of Refrigeration 5th Ed.; Refrigeration and Air Conditioning 4th Ed (ARI)									-	-	-	-	-	-
12.1 Air Systems									-	-	-	-	-	-
12.1.1 Principles of fans (types, ratings, motors, and drives)									A	-	-	B	-	-
12.1.2 Principles of air distribution systems									-	-	-	-	-	-
12.1.3 Duct airflow characteristics									A	-	-	B	-	-
12.1.4 Single path									A	-	-	B	-	-
12.1.5 Dual path									A	-	-	B	-	-
12.1.6 Multi-zone									A	-	-	B	-	-
12.1.7 Fan and system curve relationships									A	-	-	B	-	-
12.1.8 Adjust dampers and linkages									2b	-	-	b	-	-
12.1.9 General procedures for air balancing									b	-	-	b	-	-
12.1.10 Air volume measurement (methods, interpretation)									b	-	-	b	-	-
12.1.11 Indoor air quality									B	-	-	B	-	-
12.1.12 Interpret system drawings									2b	-	-	b	-	-
12.2 Hydronic Systems									-	-	-	-	-	-
12.2.1 Principles of hydronic distribution systems									A	-	-	B	-	-
12.2.2 Principles of pumps									-	-	-	-	-	-
12.2.2.1 Types and construction features									A	-	-	B	-	-
12.2.2.2 Install circulating pumps									1a	-	-	b	-	-
12.2.2.3 Adjust centrifugal water pump flow									a	-	-	b	-	-
12.2.2.4 Replace packing on water pumps									a	-	-	b	-	-
12.2.2.5 Replace mechanical seals									2b	-	-	b	-	-
12.2.2.6 Pump and system curve relationships									A	-	-	B	-	-
12.2.3 Hydronic system flow									-	-	-	-	-	-
12.2.3.1 Hydronic volume measurement (methods, interpretation)									a	-	-	b	-	-
12.2.3.2 General procedures for hydronic balancing									a	-	-	b	-	-
12.2.4 Interpret system drawings									2b	-	-	b	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A		B		C	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level (1) Course	(2) D/L	5 Skill Level (1) Course	(2) CDC	7 Skill Level (1) Course	(2) D/L
12.3 Associated Components and Equipment									-	-	-	-	-	-
12.3.1 Coils (Types & Applications)									-	-	-	-	-	-
12.3.1.1 Cooling									A	-	-	B	-	-
12.3.1.2 Heating									A	-	-	B	-	-
12.3.1.3 Preheat									A	-	-	B	-	-
12.3.1.4 Reheat									A	-	-	B	-	-
12.3.2 Fancoil units									A	-	-	B	-	-
12.3.3 Filters									A	-	-	B	-	-
12.4 Perform Recurring Maintenance									-	-	-	-	-	-
12.4.1 Determine drive belt types & sizes									a	-	-	-	-	-
12.4.2 Inspect and replace drive belts									a	-	-	b	-	-
12.4.3 Adjust drive belt tension									a	-	-	b	-	-
12.4.4 Adjust pulleys									a	-	-	b	-	-
12.4.5 Clean strainers									a	-	-	b	-	-
12.4.6 Clean air filters									a	-	-	b	-	-
12.4.7 Inspect water valves for leaks									a	-	-	b	-	-
12.4.8 Inspect fan coil units									a	-	-	b	-	-
12.4.9 Clean air handlers									a	-	-	b	-	-
12.4.10 Clean coils									a	-	-	b	-	-
12.4.11 Service water pumps									a	-	-	b	-	-
13 ELECTRICAL TR: ANSI Y32.2; AFIs 32-1062, 32-1063, 32-1064; National Electric Code (NFPA 70); National Electrical Safety Code Handbook; TOs 31-1-141-1, 31-1-141-2, 31-1-141-3, 31-1-141-5, 31-1-141-7, 31-1-141-8, 31-1-141-9									-	-	-	-	-	-
13.1 Fundamentals of electricity (AC and DC)									B	-	-	B	-	-
13.2 Types of circuits									-	-	-	-	-	-
13.2.1 Line Circuit									A	-	-	B	-	-
13.2.2 Load Circuit									B	-	-	B	-	-
13.2.3 Control Circuit (110/208, AC/DC)									B	-	-	B	-	-
13.3 Relationship of current, voltage, and resistance in circuits									B	-	-	B	-	-
13.4 Interpret electrical drawings and symbols									2b	-	-	b	-	-
13.5 Wiring Requirements									-	-	-	-	-	-
13.5.1 Supply Voltage									A	-	-	B	-	-
13.5.2 Wiring color code									A	-	-	B	-	-
13.5.3 Wire sizes									A	-	-	B	-	-
13.5.4 Distribution Panels									A	-	-	B	-	-
13.6 Protective devices									-	-	-	-	-	-
13.6.1 Circuit Breakers									A	-	-	B	-	-
13.6.2 Fuses									A	-	-	B	-	-
13.6.3 Ground Fault Current Interrupters (GFCI)									A	-	-	B	-	-
13.7 Devices									-	-	-	-	-	-
13.7.1 Switches									A	-	-	B	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
13.7.2 Receptacles									A	-	-	B	-	-
13.7.3 Timers									A	-	-	B	-	-
13.7.4 Types and principles of transformers									B	-	-	B	-	-
13.7.5 Types and principles of electromagnetic devices (relays, contactors, and across-the-line starters)									B	-	-	B	-	-
13.8 Motors									-	-	-	-	-	-
13.8.1 Types and principles (single phase and three phase)									B	-	-	B	-	-
13.8.2 Replace motors									2b	-	-	b	-	-
13.8.3 Perform operational test									2b	-	-	b	-	-
13.8.4 Align									2b	-	-	b	-	-
13.8.5 Electrically connect (single-phase and three phase)		*	*						2b	-	-	b	-	-
13.8.6 Reverse rotation of electric motors		*	*						2b	-	-	b	-	-
13.8.7 Measure motor current draw		*	*						2b	-	-	b	-	-
13.8.8 Service electrical motors									a	-	-	b	-	-
13.9 Types and principles of motor controllers and variable frequency drives									B	-	-	B	-	-
13.10 Repair Components									-	-	-	-	-	-
13.10.1 Troubleshoot electrical circuits and components									2b	-	-	b	-	-
13.10.2 Correct malfunctions									2b	-	-	b	-	-
13.11 Solder electrical connections									a	-	-	b	-	-
13.12 International Electrical Systems TR: TO 00-105A-12; AFIs 32-1062, 32-1063, 32-1064; ANSI Y32.2									-	-	-	-	-	-
13.12.1 Metric measurements									A	-	-	B	-	-
13.12.2 Frequency									A	-	-	B	-	-
13.12.3 Voltage									A	-	-	B	-	-
14 HVAC CONTROL SYSTEMS TR: AFMAN 32-1093; Automatic Controls for Heating and Air Conditioning; Refrigeration and Air Conditioning Technology 4th Ed; Control Systems 2nd Ed; Modern Refrigeration and Air Conditioning; Control Systems For Heating, Ventilation, and Air Conditioning 3rd Ed; Environmental Systems Technology									-	-	-	-	-	-
14.1 Types									-	-	-	-	-	-
14.1.1 Pneumatic HVAC Control Systems									A	-	-	B	-	-
14.1.2 Electrical HVAC Control Systems									A	-	-	B	-	-
14.1.3 Electronic HVAC Control Systems									A	-	-	B	-	-
14.1.4 Constant Air Volume (CAV)									A	-	-	B	-	-
14.1.5 Variable Air Volume (VAV)									A	-	-	B	-	-
14.1.6 Direct Digital Control (DDC)									A	-	-	B	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A		B		C	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level (1) Course	(2) D/L	5 Skill Level (1) Course	(2) CDC	7 Skill Level (1) Course	(2) D/L
14.2 Components									A	-	-	B	-	-
14.3 Principles of operation									A	-	-	B	-	-
14.4 Perform recurring maintenance									a	-	-	b	-	-
14.5 Repair Components									-	-	-	-	-	-
14.5.1 Troubleshoot									1a	-	-	b	-	-
14.5.2 Correct Malfunctions									1a	-	-	b	-	-
14.6 Calibrate and adjust									1a	-	-	b	-	-
14.7 System control strategies									A	-	-	B	-	-
14.8 Subsystem control strategies									A	-	-	B	-	-
14.9 Perform system changes									-	-	-	-	-	-
14.10 Energy monitoring & control systems (EMCS operating principles and components)									-	-	-	A	-	-
15 FUELS & FUEL SYSTEMS TR: AFI 32-1068; ASHRAE Handbook: Fundamentals									-	-	-	-	-	-
15.1 Characteristics of fuels (oil, gas)									A	-	-	B	-	-
15.2 Types and principles of fuel systems									A	-	-	B	-	-
15.3 Environmental concerns									A	-	-	B	-	-
15.4 Inspect systems for leaks									2b	-	-	b	-	-
16 BURNERS TR: ASHRAE Handbook: HVAC Systems and Equipment									-	-	-	-	-	-
16.1 Construction features and operation of burners (oil and gas)									A	-	-	B	-	-
16.2 Properties of combustion									A	-	-	B	-	-
16.3 Operation of analyzers									A	-	-	A	-	-
16.4 Perform pre-operational inspections									2b	-	-	b	-	-
16.5 Perform operational test									2b	-	-	b	-	-
16.6 Perform combustion analysis									1a	-	-	b	-	-
16.7 Compute combustion efficiency									1a	-	-	b	-	-
16.8 Adjust fuel/air ratio for proper combustion efficiency		*	*						2b	-	-	b	-	-
16.9 Perform recurring maintenance									a	-	-	b	-	-
16.10 Repair components									-	-	-	-	-	-
16.10.1 Troubleshoot									2b	-	-	b	-	-
16.10.2 Correct malfunctions									2b	-	-	b	-	-
16.11 Environmental concerns									A	-	-	B	-	-
17 WARM AIR AND RADIANT HEATING TR: ASHRAE Handbook: HVAC Systems and Equipment; ASHRAE Handbook: Applications									-	-	-	-	-	-
17.1 Types and operation									A	-	-	B	-	-
17.2 Perform Pre-operational Inspection									2b	-	-	b	-	-
17.3 Perform operational test									2b	-	-	b	-	-
17.4 Perform recurring maintenance									a	-	-	b	-	-
17.5 Repair									-	-	-	-	-	-
17.5.1 Troubleshoot									1a	-	-	b	-	-
17.5.2 Correct malfunctions									1a	-	-	b	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
18 STEAM AND HOT WATER SYSTEMS TR: AFI 32-1068; ASME Boiler Pressure Vessel Code Sections IV, VI, and VII; Steam, it's Generation and Use; ASHRAE Handbook: Applications; ASHRAE Handbook: Systems and Equipment; High Pressure Boilers 2nd Ed; Modern Hydronic Heating for Residential and Light Commercial Buildings									-	-	-	-	-	-
18.1 Properties of steam									A	-	-	B	-	-
18.2 Principles of distribution systems (types and components)									B	-	-	B	-	-
18.3 Principles of boilers (firetubes, watertubes, and cast iron)									B	-	-	B	-	-
18.4 Construction features of boilers (waterside, fireside, and external fittings)									B	-	-	B	-	-
18.5 Auxiliary equipment (feedwater system, safety devices, and controls)									B	-	-	B	-	-
18.6 Perform pre-operational inspection									2b	-	-	b	-	-
18.7 Perform operational test									2b	-	-	b	-	-
18.8 Perform recurring maintenance									a	-	-	b	-	-
18.9 Repair boilers and/or auxiliary equipment									-	-	-	-	-	-
18.9.1 Troubleshoot									2b	-	-	b	-	-
18.9.2 Correct malfunctions									2b	-	-	b	-	-
18.10 Prepare boiler for inspection (Types A, B, C, D)									a	-	-	b	-	-
19 AIR CONDITIONING & REFRIGERATION SYSTEMS TR: Refrigeration and Air Conditioning Technology 4th Ed; Modern Refrigeration and Air Conditioning 18th Ed; Trane Air Conditioning Manual; Copeland Refrigeration Manuals: Parts 1 thru 5; 40 CFR Part 82									-	-	-	-	-	-
19.1 Refrigerants (types and uses)									B	-	-	B	-	-
19.2 Oils (types and uses)									B	-	-	B	-	-
19.3 Process refrigerants for air conditioning and/or refrigeration systems IAW EPA and Air Force Standards									-	-	-	-	-	-
19.3.1 Locate refrigerant leaks		*	*						2b	-	-	b	-	-
19.3.2 Universal Certification									B	-	-	-	-	-
19.3.3 Recover and recycle refrigerant		*	*						2b	-	-	b	-	-
19.3.4 Pump down system		*	*						2b	-	-	b	-	-
19.3.5 Pressure check system		*	*						2b	-	-	b	-	-
19.3.6 Charge system		*	*						2b	-	-	b	-	-
19.3.7 Retrofit with alternative refrigerant									a	-	-	b	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
19.4 Basic refrigeration cycle									B	-	-	B	-	-
19.5 Principles of Operation & Construction Features										-	-		-	-
19.5.1 Components										-	-		-	-
19.5.1.1 Compressors (reciprocating, centrifugal, rotary, screw, scroll)									A	-	-	B	-	-
19.5.1.2 Evaporators (direct and indirect expansion)									A	-	-	B	-	-
19.5.1.3 Condensers (air and water cooled)									A	-	-	B	-	-
19.5.1.4 Cooling towers									A	-	-	B	-	-
19.5.1.5 Metering devices/flow controls expansion valves, capillary tubes/orifices, and pressure regulators									A	-	-	B	-	-
19.5.1.6 Accessories									A	-	-	B	-	-
19.5.1.7 Capacity control (compressor, condenser, and system)									A	-	-	B	-	-
19.5.2 Refrigeration systems										-	-		-	-
19.5.2.1 Commercial									B	-	-	B	-	-
19.5.2.2 Ice machines									B	-	-	B	-	-
19.5.2.3 Cold storage (permanent/portable)									B	-	-	B	-	-
19.5.3 Air conditioning systems										-	-	-	-	-
19.5.3.1 Package units									B	-	-	B	-	-
19.5.3.2 Split systems									B	-	-	B	-	-
19.5.3.3 Heat pumps									B	-	-	B	-	-
19.5.3.4 Industrial systems										-	-	-	-	-
19.5.3.4.1 Reciprocating chiller									B	-	-	B	-	-
19.5.3.4.2 Centrifugal chiller									B	-	-	B	-	-
19.5.3.4.3 Screw chiller									B	-	-	B	-	-
19.5.3.4.4 Scroll chiller									B	-	-	B	-	-
19.5.3.5 Equipment cooling									B	-	-	B	-	-
19.5.4 Multiple component system (compressors and evaporators)									A	-	-	B	-	-
19.6 Calculate and adjust superheat			*						a	-	-	b	-	-
19.7 Calculate subcooling			*						a	-	-	b	-	-
19.8 Plot pressure enthalpy chart			*						1a	-	-	b	-	-
19.9 Use pressure-temperature charts		*							1a	-	-	b	-	-
19.10 Perform pre-operational inspection									2b	-	-	b	-	-
19.11 Perform operational test									2b	-	-	b	-	-
19.12 Perform recurring maintenance									a	-	-	b	-	-
19.13 Repair										-	-	-	-	-
19.13.1 Troubleshoot									2b	-	-	b	-	-
19.13.2 Correct malfunctions									2b	-	-	b	-	-
20 AIR COMPRESSING EQUIPMENT (nonaircraft generation equipment) TR: Refrigeration and Air Conditioning, 4th Ed (ARI)										-	-	-	-	-
20.1 Types of systems									A	-	-	B	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A		B		C	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	3 Skill Level	(2) D/L	5 Skill Level	(2) CDC	7 Skill Level	(2) D/L
									(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
20.2 Construction features and principles of air compressors and accessories (reciprocating, screw, and oil-less)									A	-	-	B	-	-
20.3 Perform pre-operational inspection									1a	-	-	b	-	-
20.4 Perform operational test									1a	-	-	b	-	-
20.5 Perform recurring maintenance									b	-	-		-	-
20.6 Repair									-	-	-	-	-	-
20.6.1 Troubleshoot									1a	-	-	b	-	-
20.6.2 Correct malfunctions									1a	-	-	b	-	-
21 WATER TESTING & TREATMENT FOR HEATING AND COOLING EQUIPMENT TR: AFI 32-1054; BETZ Handbook of Industrial Water Conditioning; Principles of Industrial Water Treatment 9th Ed									-	-	-	-	-	-
21.1 Water characteristics									A	-	-	B	-	-
21.2 Purpose and types of tests									A	-	-	B	-	-
21.3 Internal treatment methods									-	-	-	-	-	-
21.3.1 Determine and adjust water levels									-	-	-	-	-	-
21.3.2 Determine and adjust treatment levels									-	-	-	-	-	-
21.3.3 Determine and adjust conductivity									-	-	-	-	-	-
21.4 External treatment methods									-	-	-	B	-	-
21.5 Chemical feeding equipment									A	-	-	B	-	-
21.6 Environmental concerns									A	-	-	B	-	-
22 EXTERNAL CORROSION TR: AFIs 32-1054, 32-1068; Principles of Industrial Water Treatment 9th Ed									-	-	-	-	-	-
22.1 Causes and types									A	-	-	B	-	-
22.2 Methods of Controlling									A	-	-	B	-	-
22.3 Environmental Concerns									A	-	-	B	-	-
23 AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES TR: AFIs 10-210, 10-211; AFPAM 10-219 V1, V2, V3, V4									-	-	-	-	-	-
23.1 Expedient repair and destruction									-	-	-	-	-	-
23.1.1 Facility Repair TR: AFPAM 10-219 V3; Home Station Training (HST) Category 1 and 2									-	-	-	-	-	-
23.1.1.1 Theory of heating/air conditioning systems expedient repair and cannibalization techniques									A	-	-	B	-	-
23.1.1.2 Fabrication methods for temporary heating/air conditioning duct									a	-	-	b	-	-
23.1.1.3 Techniques for temporary installation of mobile/portable heating units									a	-	-	b	-	-
23.1.2 Airfield Damage Repair CONOPS									-	-	-	-	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
23.2 Expedient Beddown Methods and Base Expeditionary Airfield Resources (BEAR) type assets TR: AFPAMs 10-219 V2, 10-219 V5; AFH 10-222v1									-	-	-	-	-	-
23.2.1 Immersion Heater									-	-	-	-	-	-
23.2.1.1 Principles of operation									-	-	-	A	-	-
23.2.1.2 Perform operational tests									-	-	-	-	-	-
23.2.1.3 Troubleshooting									-	-	-	-	-	-
23.2.1.4 Repairs									-	-	-	-	-	-
23.2.2 Tent Heaters Preway TR: AFPAM 10-219 V5									-	-	-	-	-	-
23.2.2.1 Principles of operation									B	-	-	B	-	-
23.2.2.2 Set-up									b	-	-	b	-	-
23.2.2.3 Perform pre-operational check	◆								2b	-	-	b	-	-
23.2.2.4 Perform operational test	◆								2b	-	-	b	-	-
23.2.2.5 Service/periodic maintenance	◆								2b	-	-	b	-	-
23.2.2.6 Troubleshooting	◆								2b	-	-	b	-	-
23.2.2.7 Repairs									b	-	-	b	-	-
23.2.3 150 Cubic Foot Refrigeration Unit TR: TO 40R7-5-7-4; TMs 5-4110-240-13&P, 9-4110-254-14									-	-	-	-	-	-
23.2.3.1 Setup									b	-	-	b	-	-
23.2.3.2 Perform pre-operational check	◆								2b	-	-	b	-	-
23.2.3.3 Perform operational test	◆								2b	-	-	b	-	-
23.2.3.4 Service/periodic maintenance	◆								2b	-	-	b	-	-
23.2.3.5 Troubleshoot									-	-	-	-	-	-
23.2.3.5.1 Using electrical schematic	◆								2b	-	-	b	-	-
23.2.3.5.2 Mechanical malfunctions	◆								2b	-	-	b	-	-
23.2.3.5.3 Repairs									b	-	-	b	-	-
23.2.4 Advanced Design Refrigeration Unit (ADR 300) TR: TO 40R7-6-1									-	-	-	-	-	-
23.2.4.1 Setup									b	-	-	b	-	-
23.2.4.2 Perform pre-operational check	◆								2b	-	-	b	-	-
23.2.4.3 Perform operational test	◆								2b	-	-	b	-	-
23.2.4.4 Service/periodic maintenance	◆								2b	-	-	b	-	-
23.2.4.5 Troubleshoot									-	-	-	-	-	-
23.2.4.5.1 Using electrical schematic	◆								2b	-	-	b	-	-
23.2.4.5.2 Mechanical malfunctions	◆								2b	-	-	b	-	-
23.2.4.5.3 Repairs									b	-	-	b	-	-
23.2.5 1200 Cubic Foot Refrigeration Unit TR: TMs 9-4110-246-14, 9-4110-254-14; TO 40R7-5-7-4									-	-	-	-	-	-
23.2.5.1 Setup									a	-	-	-	-	-
23.2.5.2 Perform pre-operational check									-	-	-	-	-	-
23.2.5.3 Perform operational test									-	-	-	-	-	-
23.2.5.4 Service/periodic maintenance									-	-	-	-	-	-
23.2.5.5 Troubleshoot									-	-	-	-	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
23.2.5.5.1 Using electrical schematic									-	-	-	-	-	-
23.2.5.5.2 Mechanical malfunctions									-	-	-	-	-	-
23.2.5.5.3 Repairs									-	-	-	-	-	-
23.2.6 Bare Base Air Conditioner (A/E 32C-39) TR: TO 35E9-163-1; TM 9-4120-398-14									-	-	-	-	-	-
23.2.6.1 Setup									b	-	-	b	-	-
23.2.6.2 Perform pre-operational check	◆								2b	-	-	b	-	-
23.2.6.3 Perform operational test	◆								2b	-	-	b	-	-
23.2.6.4 Service/periodic maintenance	◆								2b	-	-	b	-	-
23.2.6.5 Troubleshoot									-	-	-	-	-	-
23.2.6.5.1 Using electrical schematic	◆								2b	-	-	b	-	-
23.2.6.5.2 Mechanical malfunctions	◆								2b	-	-	b	-	-
23.2.6.5.3 Repairs									b	-	-	b	-	-
23.2.7 Field Deployable Environmental Control Unit (FDECU) TR: TO 35E9-314-1									-	-	-	-	-	-
23.2.7.1 Setup									b	-	-	-	-	-
23.2.7.2 Perform pre-operational check	◆								2b	-	-	b	-	-
23.2.7.3 Perform operational test	◆								2b	-	-	b	-	-
23.2.7.4 Service/periodic maintenance	◆								2b	-	-	b	-	-
23.2.7.5 Troubleshoot									-	-	-	-	-	-
23.2.7.5.1 Using electrical schematic	◆								2b	-	-	b	-	-
23.2.7.5.2 Mechanical malfunctions	◆								2b	-	-	b	-	-
23.2.7.5.3 Repairs									b	-	-	b	-	-
23.2.8 Bare Base M149 Trailer Mounted Water Chiller TR: TM 10-4130-239-14									-	-	-	-	-	-
23.2.8.1 Setup									-	-	-	-	-	-
23.2.8.2 Operate									-	-	-	-	-	-
23.2.8.3 Troubleshooting									-	-	-	-	-	-
23.2.8.4 Repairs									-	-	-	-	-	-
23.2.9 TEMPER tent erection TR: TOs 35E4-94-1, 35E4-132-1, 35E5- 6-1, 35E5-6-4; AFPAM 10-219 V1&V5; AFH 10-222 V1									-	-	-	-	-	-
23.2.9.1 Assembly									a	-	-	b	-	-
23.2.9.2 Disassembly									a	-	-	b	-	-
23.2.10 Field Water Heater (M-80) TR: TM 10-4520-259-1 3&P									-	-	-	-	-	-
23.2.10.1 Principles of operation									B	-	-	B	-	-
23.2.10.2 Setup									2b	-	-	b	-	-
23.2.10.3 Perform pre-operational check	◆								2b	-	-	b	-	-
23.2.10.4 Perform operational test	◆								2b	-	-	b	-	-
23.2.10.5 Service/periodic maintenance	◆								2b	-	-	b	-	-
23.2.10.6 Troubleshoot									-	-	-	-	-	-
23.2.10.6.1 Using electrical schematic	◆								2b	-	-	b	-	-
23.2.10.6.2 Mechanical malfunctions	◆								2b	-	-	b	-	-
23.2.10.6.3 Repairs									2b	-	-	b	-	-

1. Tasks, Knowledge And Technical References	2. Core Tasks			3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
	A	B	C	A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
	Diamond Tasks	5 Level	7 Level	Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) D/L	(1) Course	(2) CDC	(1) Course	(2) D/L
23.2.11 Small Shelter System (SSS) TR: TO 35E5-6-11SS-1									-	-	-	-	-	-
23.2.11.1 Environmental Control Unit (ECU) HAC-36-V4B									-	-	-	-	-	-
23.2.11.2 Assembly									a	-	-	b	-	-
23.2.11.3 Disassembly									a	-	-	b	-	-
23.2.12 Maintain Survivable Collective Protective System (SCPS) HVAC Systems TR: TO 35E9-163-11									-	-	-	-	-	-
23.2.13 Special purpose vehicles/equipment									-	-	-	-	-	-
23.2.13.1 High Mobility Multipurpose Wheeled Vehicle (HMMWV)									-	-	-	-	-	-
23.2.13.2 Dump truck									-	-	-	-	-	-
23.2.13.3 Front-end loader w/forklift attachment									-	-	-	-	-	-
23.2.13.4 Tactical Environment Control Units TR: TOs 35E9-263-1, 35E9-289-4, 35E9-242-4, 35E9-136-21, 35E9- 229-1, 35E9-136-31, 35E9-136-34									-	-	-	-	-	-
23.2.13.5 Chemically Hardened Air Management Plant (CHAMP)									-	-	-	-	-	-
23.2.14 Generators									-	-	-	-	-	-
23.2.14.1 Setup									-	-	-	-	-	-
23.2.14.2 Operate									-	-	-	-	-	-
23.2.14.3 Perform Operator Maintenance									-	-	-	-	-	-

Note: BLK #4: Columns (1) & (2) can be relabeled to meet CF Requirements; i.e., 2 phase 3 skill level course, 5 lvl QTPs.

AFQTP Documentation Record For AFSC 3E1X1

- Download applicable AFQTPs at
https://wwwmil.afcesa.af.mil/Directorate/CEO/Training/QTPs/ceof_3e1x1.htm
https://afcesa.csd.disa.mil/kc/main/kc_frame.asp?strURL=../adlsslim/profile/student_profile_page.aspx
- Trainers/Certifiers enter their name and initials in the identification block at beginning of the STS
- Upon administering AFQTPs, enter start date in column 4 of this record
- Upon completion of each unit, document columns 5, 6, and 7
- Upon completion of applicable CerTests, trainer will place the completion date in column 8 Where is 8
- Transcribe by entering current date in columns 5 and 8?, Trainees & Trainers Initials in columns 6 & 7

1	2	3	4	5	6	7
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL * * 7 LEVEL ◆ SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS
9.	PIPING/TUBING Ref : AFQTP Module 12 – PIPING/TUBING					
9.3.1.	Fabricate piping and tubing systems	*				
9.3.2.	Install piping and tubing systems	*				
10.	WELDING & CUTTING Ref: AFQTP Module 13 – WELDING & CUTTING					
10.2.2.	Braze and solder	*				
13.	ELECTRICAL Ref: AFQTP Module 16 – ELECTRICAL; HVAC Electrical Troubleshooting and Repair Version 1.0 Mar 00 (CD-ROM)					
13.8.5.	Electrically connect (single-phase and three phase)	*				
13.8.6.	Reverse rotation of electric motors	*				
13.8.7.	Measure motor current draw	*				
16.	BURNERS Ref: AFQTP Module 19 – BURNERS					
16.8.	Adjust fuel/air ratio for proper combustion efficiency	*				

1	2	3	4	5	6	7
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL ** 7 LEVEL ◆SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS
19. AIR CONDITIONING & REFRIGERATION SYSTEMS Ref: AFQTP Module 21 – AIR CONDITIONING & REFRIGERATION SYSTEMS						
19.3.1.	Locate refrigerants leaks	*				
19.3.3.	Recover and recycle refrigerants from refrigeration and air conditioning systems	*				
19.3.4.	Pump down refrigeration systems	*				
19.3.5.	Pressure check refrigeration systems	*				
19.3.6	Charge HVAC/R systems with refrigerant	*				
19.8.	Plot pressure enthalpy chart for refrigeration cycle	**				
19.9.	Use pressure temperature charts	*				
19.6.	Calculate and adjust superheat	**				
19.7.	Calculate subcooling	**				

NOTE 1: ♦ Diamond tasks are extremely important to the career field. Diamond tasks are the same as core tasks with one exception--equipment shortfalls at most locations have created problems with the actual hands-on certification of these tasks. In instances where required equipment is not available for instruction, completion of the task's AFQTP and passing the corresponding CerTest/Virtual Learning Center (VLC) test is all that is required for upgrade and qualification training. Hands-on certification should be accomplished at the first opportunity when equipment is available. In locations where the equipment is available for hands-on certification, CerTest/VLC test completion is still a mandatory requirement.

1	2	3	4	5	6	7	8
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL * * 7 LEVEL ♦ SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS	CerTest COMP DATE
23.	AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES Ref: AFQTP Module – AFSC SPECIFIC CONTINGENCY RESPONSIBILITIES; Preway Space Heater Version 1.0 Aug 99 (CD-ROM); 150 CU Foot Refrigerator 3E1X1-27.2.2.2 Version 1.0 (CD-ROM); Air Conditioner Bare Base 3E1X1-27.3.2.2.3C) Version 1.0 (CD ROM); M-80 Field Water Heater 3E1X1-27.3.2C Version 1.0 (CD-ROM)						
23.2.2.3.	Tent Heaters, Preway (See VLC site) Perform pre-operational check						
23.2.2.4.	Perform operational test	♦					
23.2.2.5.	Service/periodic maintenance						
23.2.2.6.	Troubleshoot						
23.2.3.2.	150 Cubic Foot Refrigeration Unit Perform pre-operational check CerTest # 8065						
23.2.3.3.	Perform operational test CerTest # 8066						
23.2.3.4.	Service/periodic maintenance CerTest # 8067	♦					
23.2.3.5.1.	Using Electrical schematic CerTest # 8068						
23.2.3.5.2.	Mechanical malfunctions CerTest # 8069						
23.2.4.2.	Advanced Design Refrigeration Unit- (ADR 300) (See VLC site) Perform pre-operational check						
23.2.4.3.	Perform operational test	♦					
23.2.4.4.	Service/periodic maintenance						
23.2.4.5.1.	Using Electrical schematic						
23.2.4.5.2.	Mechanical malfunctions						

1	2	3	4	5	6	7	8
TASK NUMBER	TASKS, KNOWLEDGE, AND TECHNICAL REFERENCES	* 5 LEVEL * * 7 LEVEL ◆ SEE NOTE 1	START DATE	COMPLETE DATE	TRAINEE'S INITIALS	TRAINER'S INITIALS	CerTest COMP DATE
23.2.6.2. 23.2.6.3. 23.2.6.4. 23.2.6.5.1. 23.2.6.5.2.	Bare Base Air Conditioner CerTest # 8084 Perform pre-operational check Perform operational tests Service/periodic maintenance Using Electrical schematic Mechanical malfunctions	◆					
23.2.7.2.	Field Deployable Environmental Control Unit (FDECU) Perform pre-operational check	◆					
23.2.7.3.	Field Deployable Environmental Control Unit (FDECU) Perform operational test CerTest # 8209	◆					
23.2.7.4.	Field Deployable Environmental Control Unit (FDECU) Service/periodic maintenance CerTest # 8210	◆					
23.2.7.5.1.	Field Deployable Environmental Control Unit (FDECU); Troubleshoot Using electrical schematic CerTest # 8211	◆					
23.2.7.5.2.	Field Deployable Environmental Control Unit (FDECU): Troubleshoot Mechanical malfunctions CerTest # 8212	◆					
23.2.10.3. 23.2.10.4. 23.2.10.5. 23.2.10.6.1. 23.2.10.6.2.	Field Water Heaters (M-80) (See VLC site) Perform pre-operational check Perform operational tests Service/periodic maintenance Using electrical schematic Mechanical Malfunctions	◆					

SECTION B - COURSE OBJECTIVE LIST (COL)

(This section used when developing lesson plans)

4. Measurement. Measurement of each objective is indicated as follows:

4.1. Written Test (W) - used to sample each knowledge objective and the knowledge components of performance objectives.

4.2. Performance Test (P) - used under specified conditions in a formal testing mode to measure student accomplishment of performance objectives after the teaching-learning activity has been completed.

4.3. Progress Checks (PC) - administered by the instructor during classroom or laboratory instruction time to assess the student's accomplishment of knowledge or performance objectives.

5. Standard. The standard is 70% on written examinations. Standards for performance measurement are indicated in the objectives and delineated on the individual progress checklist. Instructor assistance may be provided as stated during the progress check, and students may be required to repeat all or parts of the behavior until satisfactory performance is attained.

6. Proficiency Level. Most task performance is taught to the "2b" proficiency level which means the student can do most parts of the task, but does need assistance on the hardest parts of the task (partially proficient). The student can also determine step-by-step procedures for doing the task.

7. Course Objective List. These objectives are listed in the sequence taught by Block of Instruction.

7.1. Initial Skills Course. A detailed listing of the initial skills course objectives may be obtained by written request to 366 TRS/DO, 727 Missile Road, Sheppard AFB TX 76311- 2254.

7.2. 7-Skill Level Course. A detailed listing of the HVAC/R Craftsman course objectives may be obtained by written request to 366 TRS/DO, 727 Missile Road, Sheppard AFB TX 76311- 2254.

SECTION C - SUPPORT MATERIALS

8. CerTest.

8.1. CerTest is a program that uses computer-based evaluation to ensure skilled craftsmen are available to meet the Air Force's changing needs. It enhances upgrade and qualification training by testing and evaluating an individual's knowledge of the principles and procedures in each specialty.

8.1.1. The program contains tests used evaluate task knowledge received through different media such as paper products (text), videotapes, and computer-based programs.

8.1.2. The CerTest program contains *mandatory* tests, required for upgrade. All *diamond* (◆) coded tasks on the STS have a corresponding *mandatory* test.

8.1.3. CerTest is also a powerful training management tool. It can be used to find the strengths and weaknesses in an individual's training and experience. CerTest automatically records and updates all test results. The training manager can copy records to a disk so that an individual can bring current, accurate training information to a new unit; thereby helping the gaining supervisor evaluate the trainee's knowledge and experience.

8.2. CerTest also enables unit personnel to develop site-specific tests. These custom-made tests standardize testing on tasks unique to a specific duty station and/or assignment. The program contains a graphics library that may be used along with a menu-driven test editor to develop these site-specific tests.

8.3. CerTest also contains *optional* CDC pre-evaluation tools. Volume review exercises are available for progress checks after each volume is completed. After all volumes are completed in a set, the trainee may take the course review exercise before taking the final End of Course exam at the base training office. Commanders are encouraged to integrate these tools in their unit's OJT program.

8.4. CerTest has been adopted as the Air Force platform for future electronic CDC testing. The Air Force Institute for Distributive Learning (AFIADL) began using CerTest on 1 June 2000. Currently, all CE AFSs are allowed to use AFIADL's CerTest on installations where Base Test Control Facilities (TCFs) are equipped. See your UETM for further information.

8.5. The *mandatory* CerTests for each AFSC are identified, by number, with it's corresponding AFQTP on the 3E1X1 AFQTP Documentation Record.

8.6. For a complete list of up-to-date AFQTPs applicable to the 3E1X1 AFSC see our web page at:

https://wwwmil.afcesa.af.mil/Directorate/CEO/Training/QTPs/ceof_3e1x1.htm

SECTION D - TRAINING COURSE INDEX

9. Purpose. This section of the CFETP identifies training courses available for the specialty. Refer to the Education and Training Course Announcements (ETCA) web site, <https://etca.randolph.af.mil/> for complete information on Air Force courses.

10. Air Force In-Residence/Mobile Training Team (MTT) Courses.

Course Title, Developer

J3AZR3E151 01AA HVAC/R Control Systems
J3AZR3E151 04DA HVAC/R Direct Expansion Systems
J3AZR3E151 051A HVAC/R Indirect Expansion Systems

11. Air Force Institute for Advanced Distributed Learning (AFIADL) Courses.

Course Number, Title

Graduates from J8ABR3E131 00AA will use:

CDC 3E151D HVAC/R Journeyman
CDC 3E151E HVAC/R Journeyman
CDC 3E151F HVAC/R Journeyman

Graduates from J8ABR3E131 00AB will use:

CDC 3E151A HVAC/R Journeyman
CDC 3E151B HVAC/R Journeyman
CDC 3E151C HVAC/R Journeyman

12. Exportable Courses/Information.

Title

Common Core CBT, 3-level
Common Core CBT, 7-level

13. Courses Under Development/Revision

Course Number, Title

J3AZR3E151 01AB HVAC/R Control Systems
(Will replace J3AZR3E151 01AA)
J3AZR3E151 02AA Advanced Air Conditioning and Refrigeration Systems
(Will replace and combine J3AZR3E151 04DA and J3AZR3E151 051A)

SECTION E – MAJCOM-UNIQUE REQUIREMENTS

14. “There are currently no MAJCOM unique requirements. This area is reserved.”

SECTION F - HOME STATION TRAINING

15. Purpose. The purpose of this section is to identify the tasks, training references, and training sources available in support of contingency and/or wartime training. Prime BEEF forces will train to meet the full range of tasks expected in the contingency environment. Training ranges from knowledge-type training conducted in a classroom (CAT 1), to task-oriented hands-on (CAT II) training conducted in the field. These training requirements, frequencies, and sources are listed in AFI 10-210, Prime Base Emergency Engineer Force (BEEF) Program.

15.1. Home Station Training (HST). HST is training that is conducted at the individual's home station for contingency operations. The Civil Engineer Commander ensures training is provided and documented and arranges for subject matter experts to conduct training as required. Home Station training requirements fall into two categories, CAT I and CAT II.

15.1.1. Category I (CAT-I) Training. Personnel assigned to base level Civil Engineer units will receive initial and refresher training in all CAT I (knowledge-based) topics as shown in AFI 10-210, Chapter 4, Attachment 2. Units will use Readiness Training Packages (RTPs), Qualification Training Packages (QTPs), other multimedia training packages, videos, and AF CE standardized lesson plans to present the material. MAJCOMs may develop and require other training materials to accomplish knowledge-based training.

15.1.1.1. Prime BEEF Orientation/General Contingency. Upon assignment to the unit, all military and emergency-essential civilian employees will be trained on the unit's Prime BEEF and Emergency Management missions. The training will emphasize the individual's role and how he or she fits into the program. It will also include an overview of Civil Engineer Doctrine and explain the organization, training, equipment, operating concepts, and contingency missions pertaining to the unit.

15.1.1.2. General Contingency Responsibilities CD-ROM (GCRCR). Personnel may receive annual credit for the applicable CAT I training through completion of one of two available GCRCRs (one for 3-level civil engineers; the second for all other personnel). The 3-level product is a detailed version specifically designed for use as initial CAT I training. Use of this product has become critical in light of recent reductions in technical Prime BEEF training and education. All Airmen should complete this course within 90 days upon arrival at their first duty station (6 months for ARC members). A second GCRCR product is available as an optional source for attaining recurring CAT I training for those task identified in AFI 10-210, Attachment 2. Duplication of both CD's is strongly encouraged. AFCESA is in the process of transferring all courses on CD-Rom to the new AFCESA Virtual Learning Center.

https://afcesa.csd.disa.mil/kc/login/login.asp?kc_ident=kc0005

15.1.1.3. Certification Test (CerTest). Personnel who pass a CerTest computer-based exam in a CAT I contingency subject area can receive credit for that training requirement. Document training as outlined in AFI 10-210.

15.1.2. Category II (CAT-II) Training. CAT II training is primarily hands-on training as outlined in AFI 10-210, Chapter 4, Attachment 3. Units must make every effort to incorporate realism into their respective CAT II training programs. Field gear (to include primary weapons) will be used during training requirements such as, personal/work party security, convoy operations, defensive fighting positions, etc.

15.1.2.1. Combat Skills Training (CST). CST must be institutionalized as an integral part of any CAT II HST program. Lessons learned from operations such as IRAQI FREEDOM have taught us the importance of maintaining a higher level of combat readiness. Although the inclusion of combat skills-focused training into HST does not fully prepare CE personnel to work in a high threat combat environment, the steps taken to enhance CAT II training will help elevate units to a readiness level capable of supporting safe and effective operations in low to medium risk combat environments.

15.1.2.2. Mission Essential Equipment Training (MEETS). Wartime or contingency environments often involve the use of specialized and unique mission-essential equipment the Civil Engineers do not use in their day-to-day operations. Due to the cost and complexity, mission essential contingency equipment and trainer expertise are not commonly found at CONUS installations. Personnel must be hands-on certified and the certification documented in their CFEPT. AFI 10-210, Tables 4.1- 4.6 identifies minimum personnel to be trained, positions by specialty, frequencies and locations of training sites. Inadequate training on these key equipment items can negatively impact Air Force contingency operations.

15.1.3. Category III (CAT III) Training. Team Training Venues

15.1.3.1. Silver Flag Exercise Sites (CAT III). Silver Flag Exercise Sites are located at Tyndall AFB, FL; Ramstein AB, Germany; and Kadena AB, Japan and conduct CAT III training with their major focus on students being able to perform critical contingency task in a team environment. The training focuses on bare base beddown and sustainment operations using hands-on training with BEAR equipment in a realistic beddown environment. Where possible, combat skills training has been added to the curriculum to ensure realism and help fortify combat skills mentality amongst teams. All CE personnel who fill Unit Type Code (UTC) positions will receive team training at Silver Flag Exercise Sites with the exception of members on headquarters staff augmentation UTCs, pavement evaluation UTCs, and generator repair and maintenance UTCs.

15.2. Training References.

15.2.1. AFI 10-210, Prime Base Engineer Emergency Force (BEEF) Program.

Chapter four of AFI 10-210 identifies the Prime BEEF recurring training requirements. You can review this document by going to the Air Force publications web site. Attachment 2 is a list of HST CAT-I training requirements and Attachment 3 lists CAT-II training requirements.

15.2.2. Air Force Education and Training Course Announcements (ETCA).

Superseded AFCAT 36-2223. It is located at the following URL: <https://etca.randolph.af.mil> lists additional training/educational opportunities available for civil engineer personnel. This catalog contains information on formal education and training courses. The catalog is updated quarterly.

15.2.3. Readiness Training Package (RTP). RTPs are lesson plans for HST lessons. The RTPs are intended for those personnel who teach any area of HST. The index and RTPs are located on the AFCESA/CEX web page. The URL for this information is

<https://wwwmil.afcesa.af.mil/Directorate/CEX/CEXX/ContingencyTrng/default.html>

15.2.4. AFCESA/CEX. Maintains a comprehensive listing of audiovisual products that support the contingency training program. To view this listing as well as gain information on how to order specific audiovisual products, please consult the AFCESA Contingency Support page, see URL above.