

APPENDIX O

DESIGN AND CONSTRUCTION STANDARDS
FOR FACILITIES

377 CEG OPERATING INSTRUCTION 32-1001

Installations and Facilities

DESIGN AND CONSTRUCTION STANDARDS FOR FACILITIES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

NOTICE: This publication is available on the 377 CEG P: drive under Common, Pol_oi. If you lack access, contact your three-letter office.

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Supersedes CEG Policy Letter 69, 31 Jan 97 Pages: 13

This Operating Instruction (OI) implements Air Force Policy Directive (AFPD) 32-10, *Installations and Facilities*. It establishes responsibilities and procedures regarding the standardization of many of Civil Engineer's (CE's) systems, uniformity in the materials of building construction, and utility distribution systems for Kirtland Air Force Base (KAFB). These provisions are applicable in all military construction (MILCON), operation and maintenance (O&M), and in-house repair, replacement, construction, and design projects. This OI applies to all personnel assigned to the 377th Civil Engineer Group (377 CEG).

1. **RESPONSIBILITY:** The Commanders of the 377th Civil Engineer Squadron (CES), the 877th CES, and Director of CEG Engineer Division (CEC) are assigned primary responsibility for implementing this OI in KAFB facility and infrastructure upgrades and designs. Normally, the Chief of Maintenance Engineering and Architectural Engineering (AE) project managers will ensure standard building materials as stated in this OI are used in KAFB construction projects and that information is incorporated in all Military Construction Program (MCP) and AE designs. The Commanders of the 377 CES and 877 CES must assure materials ordered by squadron personnel comply with this instruction.

2. **PROCEDURES:** The following items and instruction shall provide for the standardization of building and utility construction materials on KAFB. These items shall be in conjunction with the standardization of systems as defined by Military Handbook (MIL-HDBK) 1190, *DoD Facility Planning and Design Guide*; MIL-HDBK 1008-C, *Fire Protection for Facilities Engineering Design and Construction*; Engineering Technical Letters (ETL); and Headquarter Quarters (HQ) Air Force Materiel Command (AFMC) Construction Policies. Deviations from this policy letter will require justification and approval from the 377 or 877 CES Commander or Director of the 377 CEG/CEC.

2.1. ARCHITECTURAL DISCIPLINE:

2.1.1. All exterior architectural finishes, exterior site design, and interior finishes shall be in accordance with (IAW) the Architectural Compatibility Guide (ACG) for KAFB, with the HQ AFMC Commander's Guide to Facility Excellence, Guide to Facility Quality, and Guide to Interior Design. Finishes shall be coordinated with the base architect.

2.1.2. All exterior signage shall be designed LAW Headquarters Air Force Materiel Command (HQ AFMC) Policies; Air Force Pamphlet (AFPAM) 32-1097, *Sign Standards Pamphlet*; and Fire Protection Association (NFPA) 1, *Fire Prevention Code*, section 3-7, utilizing freestanding signs.

2.1.3. All drawings and specifications shall be submitted on Auto-CAD (ACAD) (latest version), IBM format, 3 1/2 inch High Density, 1.44 mega bit (MB) disk or Microsoft Word (Latest Version). The list of publications in the specifications shall be edited to include only the specifications included in the body of the specifications. The list of publications shall contain dates for each of the following: basic specifications, amendments, interim amendments, and notices. Where several notices occur, each notice shall be individually listed and dated. Auto CAD drawings and disks shall also be in conformance with KAFB Design Standard #2 at Attachment 3.

2.1.4. Where hollow metal doors are used, use only heavy duty, extra heavy duty hollow metal doors and frames as listed under Steel Door Institute (SDI) 100, *Recommended Specification Standard Steel Door and Frame*, and NFPA 80, *Fire Doors And Fire Windows*, applies referring to fire doors.

2.1.5. Aluminum store front doors shall be dark bronze anodized minimum commercial grade with medium (min 3") or wide (min 5") stiles.

2.1.6. Windows shall have dark bronze anodized frames as specified LAW the latest American Architectural Manufacturers Association (AAMA): minimum C-20 rating.

2.1.7. Architectural floor plan numbering of rooms shall match final room numbering sequence for the facility. The AE is responsible for determining the final room numbering sequence.

2.1.8. Use minimum 4" X 4" or smaller slip resistant porcelain tile or other low absorption tile for floors in restrooms.

2.1.9. Handicapped Accessibility: Facilities will accommodate the handicapped LAW the latest edition of the Uniform Federal Accessibility Standards and the Americans With Disabilities Act.

2.1.10. Security Features: Security measures required by Air Force Instruction (AFI) 31-209, *The Air Force Resource Protection Program*, shall be installed.

2.1.11. Keying: Locks shall be Schlage D-Series to match the existing keying system. Other cylinders and cores proven to be working and interchangeable substitutes in this system will be acceptable. Locks will be furnished with construction cores. The contractor will do all keying. The base locksmith shall receive one copy of the bitting system. A key or combination for the lock must be provided to Fire Protection (CEFT) for emergency access.

2.1.12. Card reading door locks: Visiting officers quarters (VOQ) and transient lodging facilities have started using card readers for their facilities. Future door locks for these buildings should be compatible with the Sargent Manufacturing System hotel locks since the computer that programs the cards is this type.

2.1.13. Storage Buildings for New Facilities: Examine and investigate with the facility user and civil engineer the need to and requirements for storage of hazardous or flammable material required for facility and grounds maintenance. Storage unit shall be small, limited time and space, and specific in use. Storage requirements must comply with NFPA 30, *Flammable and Combustible Liquids Code*, and Air Force Occupational Safety and Health (AFOSH) 91-43, *Flammable and Combustible Liquids*. All storage requirements shall be approved by 377th Air Base Wing (ABW)/CEG and coordinated through 377 ABW Environmental Management (EM) and 377 CEG CEFT.

2.1.14. All new lay-in ceilings shall utilize 2' x 2' tiles and grid system as indicated in NFPA 101, *Life Safety Code*.

2.2. CIVIL DISCIPLINE:

2.2.1. Install metal roof membrane, either lowslope structural or architectural. Exceptions will be considered where metal roof is not practical. Large roofing areas should be divided into subareas, which can satisfactorily use sloped roof in lieu of a flat Built-Up Roof (BUR).

2.2.2. Screened dumpster pads shall be provided. Provide a concrete approach apron for each dumpster location. Screening will typically be concrete masonry unit (CMU) block and shall be designed to KAFB standards. Dumpsters must not be placed within 25 feet of any structure.

2.2.3. All utility road and driveway crossings shall be bored and sleeved with single schedule 80 Polyvinyl Chloride Pipe (PVC) or 1/4-inch wall steel sleeve. Roads and driveways shall not be crossed by open cut unless approved by the government.

2.2.4. All new and/or rehabilitated paved surfaces shall include curbing IAW HQ AFMC and KAFB instructions. Sidewalks shall have a sand cushion.

2.2.5. Utility line burial depths shall meet applicable codes and shall be at a minimum as follows:

gas service lines	18 inches
gas mains	24 inches
electrical	30 inches
water lines	36 inches

2.3. MECHANICAL DISCIPLINE:

2.3.1. Pipe and fitting materials for drainage, waste, and vent piping systems: As listed in Attachment 1.

2.3.2. Pipe and fitting materials for pressure piping systems inside the building to a point 5 feet outside the building: As listed in Attachment 2.

2.3.3. Chilled water and dual temperature water piping 6 inches and less shall be rigid copper type-L.

2.3.4. All chilled/hot water piping between buildings shall be installed in precast concrete trenches with removable covers.

2.3.5. Underground gas piping and fittings with pipe designation 2306, 2406, 3406, or 3408 shall be polyethylene, standard dimension ratio (SDR) 11.0, with all welded joints meeting American Society for Testing and Materials (ASTM) D 3350, *Standard Specification for Polyethylene Plastic Pipe and Fittings Materials*, and ASTM D 2513, *Gas, Thermoplastic, Pressure Pipe, Tubing, and Fittings*. Socket fusion fittings shall comply with ASTM D 2683, *Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing*.

2.3.6. Underground gas valves shall be ball type conforming to American Society of Mechanical Engineers (ASME) B16.40, *Manually Operated Thermoplastic Gas Shutoffs and Valves in Gas Distribution System*, and shall be of materials and manufacture-compatible with system materials used. Valves shall be SDR 11.0 and be equal to Rockwell poly valves with 2-inch square operating nut. Valves shall be of a quarter turn type with all polyethylene materials. Valve seats and seals shall be molded from resilient High Nitrile Buna N material. The ball valve shall have an obstruction-free opening to facilitate hot taps.

2.3.7. Gas risers shall be of the anodeless type with a schedule 40 epoxy-coated sleeve and polyethylene SDR 11.0 carrier pipe.

2.3.8. Interior and above-grade gas piping shall be black steel with malleable iron or steel fittings in conformance with ASME B16.3, *Malleable Iron Threaded Fittings*; and ASME B16.11, *Forged Fitting, Socket-Welding, and Threaded*; in the order given.

2.3.9. Exterior underground water distribution piping, 4 inches through 12 inches, shall be PVC elastomeric gasket-joint type, pressure class 150, and conform to American Water Works Association (AWWA) C900, *PVC Pressure Pipe, 4 in. Through 12 in., for Water Distribution*. Piping greater than 12 inches shall be PVC in conformance with AWWA C905, *PVC Water Transmission Pipe Nominal Diameters, 14 in. Through 36 in.*; or concrete-encased steel in conformance with AWWA C300, *Reinforced Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids*; AWWA C301, *Prestressed Concrete Pressure Pipe Steel-Cylinder Types, For Water and Other Liquids*; or AWWA C303, *Concrete Pressure Pipe, Bar-Wrapped Steel Cylinder Type*; rated at 150 per square inch (psi) as required.

2.3.10. Water service lines 3 inches in diameter and less shall be copper. Water service lines greater than 3 inches shall be PVC unless otherwise indicated.

2.3.11. All new water meters shall read in gallons and shall be pulse device to interface for Energy Management Control System (EMCS) readings.

2.3.12. Fire protection piping under buildings shall be ductile iron to a point 5 feet outside the building. Ductile iron fire protection risers and fire hydrant hubs shall be provided with a sacrificial anode in conformance with ETL 91-6, *Cathodic Protection*.

2.3.13. Fittings and specials on exterior water distribution shall be cast iron, built in conformance with AWWA C110, *Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. (75mm through 1200 mm), for Water and Other Liquids*. Cast iron fittings and specials shall be cement-mortar lined standard thickness IAW with AWWA C104, *Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water*. All metallic valves and fittings shall be provided with a 32-pound magnesium sacrificial anode connected by an exothermic weld through a No. 12 American Wire Grade (AWG) copper wire.

- 2.3.14. Hot and chilled water pumps 7-1/2 horsepower or less shall be of the in-line or end suction, close-coupled type. All pumps shall be provided with a filter/feeder in conformance with base standard details. Flexible connections will be used for vibration isolation.
- 2.3.15. Chilled water systems shall use air-cooled reciprocating chillers for total cooling loads of 200 tons or less. Central Mechanical plants shall be with multiple boilers and chillers and KAFB's Master Heating/Cooling Plant Zones Plan. For plants in excess of 200 tons total cooling loads, multiple air-cooled reciprocating chillers of 200 tons or less shall be utilized. Deviation from this instruction will be justified by an engineering study for life cycle costing.
- 2.3.16. All air cooled condensing coils shall be protected from hail by appropriate screens.
- 2.3.17. All duct work shall be aluminum, stainless, or galvanized sheet metal. Duct board shall not be used. All duct work must be constructed with a inspector's inspection hatch NFPA 1, also be constructed to have a smoke detector which will be connected to the Fire Alarm Panel, NFPA 90-A, *Air Conditioning and Ventilating Systems*.
- 2.3.18. All diffusers and registers in bathrooms and showers shall be constructed of aluminum and finished to match color of surrounding areas.
- 2.3.19. All outside air control dampers shall be of the low leakage type rated at 5 cubic feet per minute (CFM) maximum leakage at 4 inches water gauge static pressure when closed.
- 2.3.20. Shower pans shall not be constructed with lead sheeting. Precast terrazzo or heavy plastic shower pans or inserts shall not be used.
- 2.3.21. All exterior mechanical equipment shall be screened from view. Screen type shall be as directed by the ACG. Mechanical equipment which cannot be screened from view such as wall-mounted exhaust fans, fire alarm bells, and louvers shall be painted Western Reserve Beige, Sherwin Williams SW-2052, or Chateau Brown, Welbourne Mahogany Q2-69U, in conformance with the ACG. Fire apparatus (i.e. water gongs and fire alarm bells) will not be painted.
- 2.3.22. All gas meters shall be provided with a permanent by-pass line in order to facilitate the removal of the meter without disruption to service and shall have a pulse device for interface with the base EMCS.
- 2.3.23. All new water and gas service shall be tied into existing mains by the hot tap methods when feasible.
- 2.3.24. Direct Digital Control (DDC) systems shall be allowed as an option to Single Loop Digital Control (SLDC) panels on all O&M and MILCON projects as identified by the Energy Manager and LAW current HQ AFMC/DDC instructions. DDC shall be compatible with the base EMCS vendor of the existing central system.
- 2.3.25. Microprocessor controls on Variable Air Volume (VAV) boxes shall be compatible with the base EMCS vendor of the existing central system.
- 2.3.26. External base EMCS data transmission medium shall be fiber optics as directed by the Energy Manager.

2.3.27. Lawn sprinkler piping and fittings shall be schedule 40 PVC. Use flexible PVC tubing from mains and laterals to all sprinkler heads or swing joints equal to Lasce G&T series double swing kits. Sprinkler heads shall be of the low-flow type and impact heads are prohibited.

2.3.28. Exterior chilled water systems shall be provided with an environmentally safe Anti freeze equal to Union Carbide "Ucartherm" or Dow Chemical "Dowtherm."

2.3.29. Administrative areas shall not be conditioned with refrigerated air. Evaporative cooling shall be provided in conformance with MIL-HDBK-1190.

2.3.30. All new water closets shall be rated at 1.6 gallons or less per flush and meet at least 90% of ASTM flush standard.

2.3.31. All new urinals shall be of the waterless type.

2.3.32. All new air handling units shall utilize 2" thick pleated throwaway filters, either 20" x 20" or 20" x 25."

2.3.33. Purchasing Halon extinguishing systems for facility applications is prohibited. For proper fire extinguishing agent, contact CEFT. The acquisition of facility air conditioning systems and support equipment using ozone-depleting chemicals (ODC) is prohibited. The purchase of ODC solvents or equipment which requires ODC solvents is prohibited.

2.4. ELECTRICAL DISCIPLINE:

2.4.1. Shall meet the requirements of the National Electric Code (NEC)

2.4.1.1. Conductors

2.4.1.1.1. Building Conductors

2.4.1.1.1.1. All interior wiring and service conductors shall be copper, minimum #12 AWG.

2.4.1.2. Medium Voltage Conductors

2.4.1.2.1. Conductors shall be 15 kilovolts (KV), Ethylene Propylene Rubber (EPR), 133% insulation. Minimum #2 AWG.

2.4.2. Conduit

2.4.2.1. Aluminum conduit shall not be imbedded in concrete or masonry, buried in earth, or used to penetrate firewalls. If conduit runs penetrate firewalls, steel conduit shall be used for a minimum of 3 feet on each side. Penetrations will be filled with a fire retardant material and proper documentation from the manufacture will be provided to CEFT. Pole risers shall be intermediate metal conduits in conformance with National Electrical Code (NEC). Conduits should not be used as grounding for equipment.

2.4.2.2. Set-screw connectors and couplings shall not be used.

2.4.3. Underground Distribution

2.4.3.1. All underground distribution cable shall be installed in concrete-encased non-metallic ducts or concrete-encased, galvanized, rigid steel conduits. Concrete markers shall be provided at 200-foot intervals and at each change in direction to indicate the location of underground cable route. A metallic/magnetic warning tape shall be buried 6 to 12 inches below the surface and above the duct. Installation shall be IAW KAFB Distribution Standards.

2.4.4. Transformers

2.4.4.1. Transformer shall be designed for operation at an altitude of 6,000 feet. Transformers shall be provided with a no-load tap changer with two 2-1/2% above- and two 2-1/2% below-rated voltage taps. The high-voltage compartment shall be dead-front construction with loadbreak switching. Switches will be mounted inside the transformer tank with switch operating handles located in the high voltage compartment and equipped with metal loops for hook stick operation. Adjacent to switches, nameplates shall identify switch operating handles and "ON" and "OFF" positions. Installation shall be IAW KAFB Distribution Standards.

2.4.5. Lighting Levels, Foot Candles (FC) shall be in accordance with IES standards and shall be no less than the following for areas listed:

Accounting Room	75 FC	Mechanical Rooms	15 FC
Auditoriums	20 FC	General Office Space	50 FC
Cafeterias	25 FC	Closets	5 FC
Computer Rooms	50 FC	Kitchens	70 FC
Conference Rooms	30 FC	Lobbies	15 FC
Corridors	10 FC	Restrooms	20 FC
Drafting Rooms	75 FC		

2.4.6. Fluorescent Fixtures

2.4.6.1. Ballasts - Ballasts shall be solid-state, high frequency, rapid start electronic ballasts capable of operating the T-8 lamps indicated. Ballasts shall be high power factor type with a Power Factor of 0.99 or greater. Total Line Current Harmonic Distortion shall not exceed 10%. Third Harmonic Distortion shall not exceed 6%.

2.4.6.2. Lamp operation shall be at 25 kilohertz (KHZ) minimum, with 2% maximum flicker. Ballasts shall be rapid start, low-noise, Type 1, Class P thermal protection, sound rated "A." Ballast shall withstand line transients described in IEEE C62.41, *IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits*. Electronic ballasts shall have an average current crest factor of 1.5 or less, (peak to RMS), or comply with American National Standard Institute (ANSI) C82.1, *Ballasts for Fluorescent Lamp High Frequency Ballast Standard*. Ballast shall have a warranty of 3 years and a replacement labor allowance of \$10.

2.4.6.3. Lamps - Fixture lamps shall conform to ANSI C78.1, *Rapid Start Types Dimensional and Electrical Characteristics*. Lamps shall be rapid start. 4,100 degrees Kelvin color temperature, color rendering index (CRI) of not less than 75 CRI. 32 watt nominal, T-8, 1-inch diameter tubes, 4-foot length, with a medium bipin base. Lamps shall only be operated on ballasts designed for T-8 lamps. Initial lumen output shall be at least 2,850 lumens. Rated lamp life shall be at least 20,000 hours, per Industrial Engineering Standard (IES) NA-LM 40, *Approved Method for Life Performance Testing of Fluorescent Lamps*, operating on a rapid start mode. Lamp lumen depreciation (LLD) shall result in a mean lumen value of at least 2,565 lumens (90% of the initial lamp lumens) at 40% of rated life (8,000 hours) and at least 2,390 lumens (84% of the initial lamp lumens) at 70% of rated life (14,000 hours). Lamps shall be as manufactured by Philips, Osram Sylvania, General Electric, or approved equal. No U-shaped fluorescent lamps or 2' x 2' fluorescent fixtures shall be permitted.

2.4.7. Exit Lights

2.4.7.1. Provide high intensity light-emitting-diode (LED) type exit signs with the following standard features: die cast aluminum housing, canopy, and faceplate with black powder coated finish; dual voltage (120V/277V); polymeric diffuser; red face with 6-inch high white letters; single face, or double face and arrows, as required; 3 watts maximum (for either a single or double face version). The emergency features shall comply with NFPA 170, Fire Safety Symbols: maintenance-free nickel cadmium battery; automatic low-voltage disconnect; reverse polarity, and short-circuit protection; AC indicator light; push-to-test switch; constant-current charger. Letter coloring shall be red. The unit shall carry a minimum of a 12-year full warranty (lamp included). The nickel cadmium battery shall carry a minimum of a 5-year full warranty. Radio luminescent signs and markers are prohibited.

2.4.8. Exterior lights

2.4.8.1. New or exterior lights shall meet the standards of "dark sky." This means there will be no sky glow which is overhead glare due to light directed above the horizontal plain reflecting off of particulate matter and water vapor on the atmosphere interfering with a complete view of the night sky. There will be no light trespass whereby light levels, direction, or portioning cause light to overpower outside of its intended use and onto an area managed, owned, or operated by another entity. New exterior lighting will comply with NFPA 101, section A5-8.1.1.

2.4.9. Metering

2.4.9.1. All meters shall contain a separate indicator for measuring maximum kilowatt demand and a pulse initiator. Pulse initiators shall be solid state and factory installed. Meters shall be installed with shorting blocks or test switches to allow removal of the meter.

2.4.9.2. Potential transformers shall be provided with fuses and all mounting hardware. Accuracy shall be 0.3 for W, X, and Y burdens and 1.2 for Z burden at 120 volts.

2.4.9.3. Current transformer shall have a minimum rating of 180% of maximum load, a continuous thermal rating of 1.33 or greater, and an accuracy not less than 0.3% - 0.5%.

2.4.10. Base security and fire alarm systems shall be compatible with existing base systems and standards. Installation of new fire alarm systems will only be accepted after a compliance acceptance inspection has been completed by the Base Fire Department (only).

LAVON ALSTON, Colonel, USAF
Commander

Attachments:

1. Pipe and Fitting Materials for Drainage, Waste, and Vent Piping Systems
2. Pipe and Fitting Materials for Pressure Piping Systems
3. ACAD Drawing Standard Project Document Format

**PIPE AND FITTING MATERIALS FOR
DRAINAGE, WASTE, AND VENT PIPING SYSTEMS**

Item No.	Pipe and Fitting Materials	SERVICE				
		A	B	C	D	E
1	Cast iron soil pipe and fittings, hub and spigot, ASTM A 74 with compression gaskets	X	X	X	X	X
2	Cast iron soil pipe and fittings hubless, CISPI 301		X		X	
3	Cast copper alloy solder joint pressure fittings, ANSI B16.18 for use with Item 9				X	X
4	Seamless copper pipe, ASTM B42				X	X
5	Cast bronze threaded fittings, ANSI B16.15				X	X
6	Copper drainage tube, (DWV), ASTM B 306		X		X	X
7	Wrought copper and wrought copper alloy solder-joint drainage fittings. ANSI B 16.29		X		X	X
8	Cast copper alloy solder joint drainage fittings, DWV, ANSI B 16.23		X		X	X
9	Cast bronze threaded fittings ANSI B 16.15			X	X	

A - Underground Building Soil, Waste, and Storm Drain

B - Aboveground Soil, Waste, Drain In Buildings

C - Underground Vent

D - Aboveground Vent

E - Interior Rainwater Conductors Aboveground

* - Hard Temper

PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS

Item No.	Pipe and Fitting Materials	SERVICE			
		A	B	C	D
1	Steel pipe seamless, black ASTM A 53, Type S, Grade B, Item 3			X	
2	Seamless copper water tube, ASTM B 88	X**	X**	X**	D***
3	Seamless and welded copper	X	X		X***
4	Wrought copper and bronze solder-joint pressure fittings, ANSI B 16.22 for use with Items 2 and 3	X	X	X	X
5	Cast copper alloy solder-joint pressure fittings, ANSI B 16.18 for use with Items 2 and 3	X	X	X	X
6	Unions: brass or bronze, Fed. Spec. WW-U-516	X	X		
7	Nipples, pipe threaded Fed Spec WW-N-351			X	

A - Cold Water Aboveground, 6" or less

B - Hot Water 180 F Maximum Aboveground, 6" or less

C - Compressed Air Nonoil-Free

D - Water Service Below ground

Indicated types are minimum wall thicknesses.

** - Type L - Hard

*** - Type K - Hard temper with brazed joints only or type K-soft temper without joints in or under floors

ACAD DRAWING STANDARD PROJECT DOCUMENT FORMAT

1. All drawings will be computer generated using MS-DOS ACAD release 12 unless otherwise approved. Drawing originals shall be in black ink on 24" x 36" or 28" x 40" mylar sheets. Drawings shall be accurate and in sufficient detail to enable proper and satisfactory construction of the entire project. The quality and workmanship of the drawings shall permit clear and legible reproductions.
2. Drawings not computer generated shall be on single or double matt mylar (polyester film) media, three mils minimum thickness. When "stick-on" or "cut-in" methods of drafting are used, the final drawing shall be a direct contact mylar (photographic) copy.
3. All sheets, except the cover sheet, shall have the title block and borders. The title block layout information shall be furnished by the government on magnetic media in MS-DOS (see Attachment 1). The title block shall include: Air Force Materiel Command; Kirtland Air Force Base, New Mexico; complete project title; sheet title (this shall be the largest type set in this block); sequential number, e.g., 1 of 78 for the entire drawing set. The division number, e.g., C-1 of C-22 may be included at the option of the A-E. All drawings shall contain a signed professional registration seal. The signature note and approval blocks shall be on the first title block sheet only. The position of the signature note and approval blocks shall be designated by the government (see Attachments 2 & 4). The standard cover and index sheet shall be furnished by the government on magnetic media in MS-DOS. The Index of Drawings shall be filled in by the A-E and will show Sequence Number, Sheet Number (if Used), and Title (see Attachment 3). Custom Cover Sheets will be used when renderings are required or otherwise requested/approved by the government (see Attachment 4).
4. Computer Aided Design and Drafting (CADD) drawings shall conform to the following:
 - 4.1. Formatted to ACAD, Release 12 on MS-DOS (unless otherwise approved).
 - 4.2. Drawing files shall be purged of all information not required for actual plotting of drawings. File name will be the MHMV project number plus two sequential sheet numbers. The title block shall stay on its own layer and not be altered. Zip drawings are not allowed unless DWG file is too large for diskette.
 - 4.3. Drawings will be on 28" X 40" or 24" X 36". A copy of the forms will be provided to the A-E by the government. In addition, one set of drawings will be reduced to 8 1/2" X 11" for submission to the government. One of these sets will be furnished to the Base Fire Protection Division (CEF).
 - 4.4. Each drawing file shall contain only one drawing. The drawing must be complete within itself (no external references). All text used shall be default ACAD fonts. Third party software may be used only if it becomes part of ACAD, requiring no additional software to access or view. Menu shall be ACAD. Typical text shall be 0.10" high when final full-size plots are produced.
 - 4.5. All construction drawing graphics including text will be ACAD-generated only using default settings. This will prevent government from having to purchase further software necessary to access or view any or all parts of drawings, especially fonts, unless prior approval is obtained from the contracting officer.

4.6. Screen color to plot width:

<u>SCREEN COLOR</u>	<u>PLOT THICKNESS (Black Ink)</u>
Blue	0.19 mm
Red/Green	0.25 mm
Yellow/Magenta	0.35 mm
Cyan	0.50 mm
White	0.70 mm
All Others	0.35 mm

4.7. Each layer shall be numbered and/or titled. Layer assignments shall be guidelines. The Kirtland Air Force Base prototype title block will be on its own separate layer.

4.8. Any changes to this section shall be submitted to government for prior approval.