

# Mechanical Requirements Description

2003 IECC

Report Date:  
Data filename: C:\Program Files\AutoCAD 2002\DWG\LINEAR\COOKS\COOKS.cck

The following list provides more detailed descriptions of the requirements in Section 4 of the Mechanical Compliance Certificate.

## Requirements Specific To: HVAC System 1 :

- The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Heat Pump: 6.8 HSPF, 10.0 SEER
- Heat pumps having supplementary electric resistance heat must have controls that, except during defrost, prevent supplementary heat operation when the heat pump can meet the heating load.

## Requirements Specific To: HVAC System 4 :

- The specified heating and/or cooling equipment is covered by the ASHRAE 90.1 Code and must meet the following minimum efficiency: Heat Pump: 6.8 HSPF, 10.0 SEER
- Heat pumps having supplementary electric resistance heat must have controls that, except during defrost, prevent supplementary heat operation when the heat pump can meet the heating load.

## Requirements Specific To: Storage Water Heater 1 :

- Piping for the specified circulating service hot water system must be insulated with a minimum of 1-in. insulation having a conductivity no >0.28 Btu-in/(h-ft<sup>2</sup>-degrees F)
- Circulating service hot water systems must have a time switch control that can automatically turn off the system during unoccupied hours.
- Service water heating equipment used solely for heating potable water, pool heaters, and hot water storage tanks must meet the following minimum efficiency: Electric Water Heater efficiency >= 0.88 EF, 241 SL Btu/h (if > 12 kW)

## Generic Requirements: Must be met by all systems to which the requirement is applicable:

- Design heating and cooling loads for the building must be determined using procedures in the ASHRAE Handbook of Fundamentals or an approved equivalent calculation procedure.
- All equipment and systems must be sized to be no greater than needed to meet calculated loads. A single piece of equipment providing both heating and cooling must satisfy this provision for one function with the capacity for the other function as small as possible, within available equipment options.  
Exception: The equipment and/or system capacity may be greater than calculated loads for standby purposes. Standby equipment must be automatically controlled to be off when the primary equipment and/or system is operating.  
Exception: Multiple units of the same equipment type whose combined capacities exceed the calculated load are allowed if they are provided with controls to sequence operation of the units as the load increases or decreases.

- Each heating or cooling system serving a single zone must have its own temperature control device.
- Each humidification system must have its own humidity control device.
- The system or zone control must be a programmable thermostat or other automatic control meeting the following criteria: a) capable of setting back temperature to 55 degrees F during heating and setting up to 85 degrees F during cooling; b) capable of automatically setting back or shutting down systems during unoccupied hours using 7 different day schedules; c) have an accessible 2-hour occupant override; d) have a battery back-up capable of maintaining programmed settings for at least 10 hours without power.  
Exception: A setback or shutoff control is not required on thermostats that control systems serving areas that operate continuously.  
Exception: A setback or shutoff control is not required on systems with total energy demand of 2 kW (6.826 Btu/h) or less.

- Outdoor-air supply systems with design airflow rates >3,000 cfm of outdoor air and all exhaust systems must have dampers that are automatically closed while the equipment is not operating.
- The system must supply outside ventilation air as required by Chapter 4 of the International Mechanical Code. If the ventilation system is designed to supply outdoor-air quantities exceeding minimum required levels, the system must be capable of reducing outdoor-air flow to the minimum required levels.
- Air ducts must be insulated to the following levels: a) Supply and return air ducts for conditioned air located in unconditioned spaces (spaces neither heated nor cooled) must be insulated with a minimum of R-5. Unconditioned spaces include attics, crawl spaces, unheated basements, and unheated garages. b) Supply and return air ducts and plenums must be insulated to a minimum of R-8 when located outside the building. c) When ducts are located within exterior components (e.g., floors or roofs),

- minimum R-8 insulation is required only between the duct and the building exterior.  
Exception: Duct insulation is not required on ducts located within equipment.  
Exception: Duct insulation is not required when the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15 degrees F.

- All joints, longitudinal and transverse seams, and connections in ductwork must be securely sealed using weldments, mechanical fasteners with seals, gaskets, or mastics; mesh and mastic sealing systems; or tapes. Tapes and mastics must be listed and labeled in accordance with UL 181A or UL 181B.  
Exception: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressures less than 2 inches w.g. pressure classification.

- Mechanical fasteners and seals, mastics, or gaskets must be used when connecting ducts to fans and other air distribution equipment, including multiple-zone terminal units.
- All pipes serving space-conditioning systems must be insulated as follows: Hot water piping for heating systems: 1 in. for pipes <= 1 1/2-in. nominal diameter; 2 in. for pipes > 1 1/2-in. nominal diameter. Chilled water, refrigerant, and brine piping systems: 1 in. insulation for pipes <= 1 1/2-in. nominal diameter; 1 1/2 in. insulation for pipes > 1 1/2-in. nominal diameter. Steam piping: 1 1/2 in. insulation for pipes <= 1 1/2-in. nominal diameter; 3 in. insulation for pipes > 1 1/2-in. nominal diameter.  
Exception: Pipe insulation is not required for factory-installed piping within HVAC equipment.  
Exception: Pipe insulation is not required for piping that conveys fluids having a design operating temperature range between 55 degrees F and 105 degrees F.  
Exception: Pipe insulation is not required for piping that conveys fluids that have not been heated or cooled through the use of fossil fuels or electric power.  
Exception: Pipe insulation is not required for runout piping not exceeding 4 ft in length and 1 in. in diameter between the control valve and HVAC coil.

- Operation and maintenance documentation must be provided to the owner that includes at least the following information: a) equipment capacity (input and output) and required maintenance actions; b) equipment operation and maintenance manuals; c) HVAC system control maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions; desired or field-determined set points must be permanently recorded on control drawings, at control devices, or, for digital control systems, in programming comments; d) complete narrative of how each system is intended to operate.

- Each supply air outlet or diffuser and each zone terminal device (such as VAV or mixing box) must have its own balancing device. Acceptable balancing devices include adjustable dampers located within the ductwork, terminal devices, and supply air diffusers.

- Service water heating equipment must meet minimum Federal efficiency requirements included in the National Appliance Energy Conservation Act and the Energy Policy Act of 1992, which meet or exceed ASHRAE 90.1 Code. New service water heating equipment can be assumed to meet these requirements.

- Water-heating equipment must be provided with controls that allow the user to set the water temperature to 110 degrees F for dwelling units and 90 degrees F for other occupancies. Controls must limit output temperatures of lavatories in public facility restrooms to 110 degrees F.

- Stair and elevator shaft vents must be equipped with motorized dampers capable of being automatically closed during normal building operation and interlocked to open as required by fire and smoke detection systems. All gravity outdoor air supply and exhaust hoods, vents, and ventilators must be equipped with motorized dampers that will automatically shut when the spaces served are not in use. Exceptions: - Gravity (non-motorized) dampers are acceptable in buildings less than three stories in height above grade. - Ventilation systems serving unconditioned spaces.

- Each supply air outlet or diffuser and each zone terminal device (such as VAV or mixing box) must have its own balancing device. Acceptable balancing devices include adjustable dampers located within the ductwork, terminal devices, and supply air diffusers.

- Service water heating equipment must meet minimum Federal efficiency requirements included in the National Appliance Energy Conservation Act and the Energy Policy Act of 1992, which meet or exceed ASHRAE 90.1 Code. New service water heating equipment can be assumed to meet these requirements.

- Water-heating equipment must be provided with controls that allow the user to set the water temperature to 110 degrees F for dwelling units and 90 degrees F for other occupancies. Controls must limit output temperatures of lavatories in public facility restrooms to 110 degrees F.

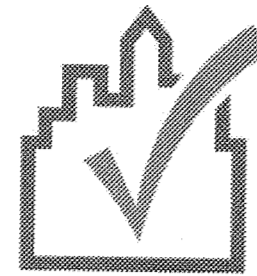
- Stair and elevator shaft vents must be equipped with motorized dampers capable of being automatically closed during normal building operation and interlocked to open as required by fire and smoke detection systems. All gravity outdoor air supply and exhaust hoods, vents, and ventilators must be equipped with motorized dampers that will automatically shut when the spaces served are not in use. Exceptions: - Gravity (non-motorized) dampers are acceptable in buildings less than three stories in height above grade. - Ventilation systems serving unconditioned spaces.

- Each supply air outlet or diffuser and each zone terminal device (such as VAV or mixing box) must have its own balancing device. Acceptable balancing devices include adjustable dampers located within the ductwork, terminal devices, and supply air diffusers.

- Service water heating equipment must meet minimum Federal efficiency requirements included in the National Appliance Energy Conservation Act and the Energy Policy Act of 1992, which meet or exceed ASHRAE 90.1 Code. New service water heating equipment can be assumed to meet these requirements.

- Water-heating equipment must be provided with controls that allow the user to set the water temperature to 110 degrees F for dwelling units and 90 degrees F for other occupancies. Controls must limit output temperatures of lavatories in public facility restrooms to 110 degrees F.

- Stair and elevator shaft vents must be equipped with motorized dampers capable of being automatically closed during normal building operation and interlocked to open as required by fire and smoke detection systems. All gravity outdoor air supply and exhaust hoods, vents, and ventilators must be equipped with motorized dampers that will automatically shut when the spaces served are not in use. Exceptions: - Gravity (non-motorized) dampers are acceptable in buildings less than three stories in height above grade. - Ventilation systems serving unconditioned spaces.



COMcheck Software Version 3.5.3

# Mechanical Compliance Certificate

2003 IECC

Report Date: 03/11/09  
Data filename: C:\Program Files\AutoCAD 2002\DWG\LINEAR\COOKS\COOKS.cck

## Section 1: Project Information

Project Type: **New Construction**

Project Title: Cooks Childrens Hospital Clinic

Construction Site: FM 731 Burleson, TX  
Owner/Agent: Linear Architects Irving, TX  
Designer/Contractor: The Purdy Consultants Dallas, TX

## Section 2: General Information

Building Location (for weather data): Fort Worth, Texas  
Climate Zone: 5b  
Heating Degree Days (base 65 degrees F): 2625  
Cooling Degree Days (base 65 degrees F): 2360

## Section 3: Mechanical Systems List

Quantity	System Type & Description
2	HVAC System 1: Split System Heat Pump, Cooling Capacity <54 kBtu/h, Air-Cooled Condenser / Single Zone
2	HVAC System 4: Split System Heat Pump, Cooling Capacity >=54 - <65 kBtu/h, Air-Cooled Condenser / Single Zone
1	Storage Water Heater 1: Service Water Heater w/ Circulation Pump

## Section 4: Requirements Checklist

- Requirements Specific To: HVAC System 1 :**
- 1. Equipment minimum efficiency: Heat Pump: 6.8 HSPF, 10.0 SEER
  - 2. Heat pump thermostat required when supplemental electric resistance heat is installed
- Requirements Specific To: HVAC System 4 :**
- 1. Equipment minimum efficiency: Heat Pump: 6.8 HSPF, 10.0 SEER
  - 2. Heat pump thermostat required when supplemental electric resistance heat is installed

- Requirements Specific To: Storage Water Heater 1 :**
- 1. 1-in. pipe insulation on circulation systems
  - 2. Automatic on/off control required for circulating systems
  - 3. Electric Water Heater efficiency >= 0.88 EF, 241 SL, Btu/h (if > 12 kW)

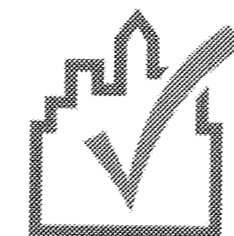
## Generic Requirements: Must be met by all systems to which the requirement is applicable:

- 1. Load calculations per 2001 ASHRAE Fundamentals
- 2. Plant equipment and system capacity no greater than needed to meet loads  
Exception: Standby equipment automatically off when primary system is operating  
Exception: Multiple units controlled to sequence operation as a function of load
- 3. Minimum one temperature control device per system
- 4. Minimum one humidity control device per installed humidification/dehumidification system
- 5. Automatic Controls: Setback to 55 degrees F (heat) and 85 degrees F (cool); 7-day clock, 2-hour occupant override, 10-hour backup  
Exception: Continuously operating zones  
Exception: 2 kW demand or less, submit calculations
- 6. Automatic shut-off dampers on exhaust systems and supply systems with airflow >3,000 cfm
- 7. Outside-air source for ventilation, system capable of reducing OSA to required minimum
- 8. R-5 supply and return air duct insulation in unconditioned spaces R-8 supply and return air duct insulation outside the building R-8 insulation between ducts and the building exterior when ducts are part of a building assembly  
Exception: Ducts located within equipment  
Exception: Ducts with interior and exterior temperature difference not exceeding 15 degrees F.
- 9. Ducts sealed - longitudinal seams on rigid ducts; transverse seams on all ducts; UL 181A or 181B tapes and mastics less than 2 inches w.g. pressure classification  
Exception: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressures less than 2 inches w.g. pressure classification
- 10. Mechanical fasteners and sealants used to connect ducts and air distribution equipment
- 11. Hot water pipe insulation: 1 in. for pipes <= 1.5 in. and 2 in. for pipes > 1.5 in. Chilled water/refrigerant/brine pipe insulation: 1 in. for pipes <= 1.5 in. and 1.5 in. for pipes > 1.5 in. Steam pipe insulation: 1.5 in. for pipes <= 1.5 in. and 3 in. for pipes > 1.5 in.  
Exception: Piping within HVAC equipment  
Exception: Fluid temperatures between 55 and 105 degrees F  
Exception: Fluid not heated or cooled  
Exception: Runouts < 4 ft in length
- 12. Operation and maintenance manual provided to building owner
- 13. Balancing devices provided in accordance with IMC 603.15
- 14. Newly purchased service water heating equipment meets the efficiency requirements
- 15. Water heater temperature controls: 110 degrees F for dwelling units or 90 degrees F for other occupancies
- 16. Stair and elevator shaft vents are equipped with motorized dampers

## Section 5: Compliance Statement

**Compliance Statement:** The proposed mechanical design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2003 IECC requirements in COMcheck Software Version 3.5.3 and to comply with the mandatory requirements in the Requirements Checklist.

JAMES M. PURDY ENGINEER  
Name - Title  
Signature  
Date 3-16-09



COMcheck Software Version 3.5.3

# Interior Lighting Application Worksheet

2003 IECC

Report Date:  
Data filename: C:\Program Files\AutoCAD 2002\DWG\LINEAR\COOKS\COOKS.cck

## Section 1: Allowed Lighting Power Calculation

A	B Floor Area	C Allowed Watts / ft <sup>2</sup>	D Allowed Watts
Medical and Clinical Care	5194	1.2	6233

Total Allowed Watts = 6233

## Section 2: Proposed Lighting Power Calculation

Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	A	B Lamps/ # of Fixture	C Fixture Watt.	D (C X D)	E
Medical and Clinical Care (5194 sq ft.)					
Linear Fluorescent 1: A: 48' T8 32W / Electronic	2	81	65	5265	
Linear Fluorescent 2: B: 48' T8 32W / Electronic	2	2	65	130	
Compact Fluorescent 1: D: Triple 4-in 26W / Electronic	1	14	29	406	
Linear Fluorescent 3: F: 48' T8 32W / Electronic	1	11	32	352	
Linear Fluorescent 4: C: 24' T8 17W / Magnetic	1	3	24	72	
Total Proposed Watts =				6225	

## Section 3: Compliance Calculation

If the Total Allowed Watts minus the Total Proposed Watts is greater than or equal to zero, the building complies.  
Total Allowed Watts = 6233  
Total Proposed Watts = 6225  
Project Compliance = YES  
7.8

Interior Lighting PASSES: Design 0.1% better than code



COMcheck Software Version 3.5.3

# Interior Lighting Compliance Certificate

2003 IECC

Report Date: 03/11/09  
Data filename: C:\Program Files\AutoCAD 2002\DWG\LINEAR\COOKS\COOKS.cck

## Section 1: Project Information

Project Type: **New Construction**

Project Title: Cooks Childrens Hospital Clinic

Construction Site: FM 731 Burleson, TX  
Owner/Agent: Linear Architects Irving, TX  
Designer/Contractor: The Purdy Consultants Dallas, TX

## Section 2: General Information

Building Use Description by: Medical and Clinical Care  
Building Type: Medical and Clinical Care  
Floor Area: 5194

## Section 3: Requirements Checklist

### Interior Lighting:

- 1. Total proposed watts must be less than or equal to total allowed watts.  
Allowed Watts Proposed Watts Complies  
6233 6225 YES
- 2. Exit signs 5 Watts or less per side.

### Exterior Lighting:

- 3. Efficacy greater than 45 lumens/W.  
Exceptions:  
Specialized lighting highlighting features of historic buildings; signage; safety or security lighting; low-voltage landscape lighting.

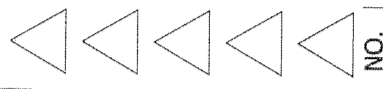
### Controls, Switching, and Wiring:

- 4. Independent controls for each space (switch/occupancy sensor).  
Exceptions:  
Areas designated as security or emergency areas that must be continuously illuminated. Lighting in stairways or corridors that are elements of the means of egress.
- 5. Master switch at entry to hotel/motel guest room.
- 6. Individual dwelling units separately metered.
- 7. Each space provided with a manual control to provide uniform light reduction by at least 50%.  
Exceptions:  
Only one luminaire in space:  
An occupant-sensing device controls the area:  
The area is a corridor, storeroom, restroom, public lobby or guest room;  
Areas that use less than 0.6 Watts/sq. ft.
- 8. Automatic lighting shutoff control in buildings larger than 5,000 sq. ft.  
Exceptions:  
Areas with only one luminaire, corridors, storerooms, restrooms, or public lobbies.
- 9. Photocell/astrometrical time switch on exterior lights.  
Exceptions:  
Lighting intended for 24 hour use.
- 10. Tandem wired one-lamp and three-lamp ballasted luminaires (No single-lamp ballasts).  
Exceptions:  
Electronic high-frequency ballasts; Luminaires on emergency circuits or with no available pair.

## Section 4: Compliance Statement

**Compliance Statement:** The proposed lighting design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 2003 IECC, Chapter 6, requirements in COMcheck Software Version 3.5.3 and to comply with the mandatory requirements in the Requirements Checklist.

JAMES M. PURDY ENGINEER  
Name - Title  
Signature  
Date 3-16-09



CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT THE JOB SITE AND NOTIFY THE ARCHITECTS OF ANY DIMENSIONAL ERRORS, OMISSIONS OR DISCREPANCIES BEFORE BEGINNING OR FABRICATING ANY WORK  
DO NOT SCALE DRAWINGS



linear!  
the architecture of Kemerly Brundige and Young  
5005 W. Royal Lane Suite 144  
Irving, TX 75063  
Fax: 972.432.0626  
inbox@linear-architecture.com

COOK CHILDREN'S  
PRIMARY CARE CLINIC  
BURLESON, TX

JOB NUMBER  
**09.016**

SHEET TITLE  
**ENERGY CODE  
COMPLIANCE  
DOCUMENTS**  
SHEET NUMBER

**EC1**

DATE OF ORIGINAL ISSUE  
© MARCH 16, 2009