COM*check* Software Version 3.2.0

Mechanical Requirements Description

2004 IECC

Report Date:

Data filename: C:\Program Files\Check\COMcheck\06095.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 :

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
2. 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: Instantaneous Water Heater 1 :

1. Heat traps are required on noncirculating water heating systems on both inlet and outlet connections. Heat traps may be purchased or field-fabricated by creating a loop or inverted U-shaped arrangement on the inlet and outlet pipes.
2. Pipe insulation for the specified noncirculating service hot water system is required for all piping in the following categories:a) the first 8 ft of outlet piping from any constant-temperature, noncirculating storage systemb) the inlet piping between the storage tank and a heat trap in a noncirculating storage systemPipe insulation must be at least 1/2 in. and have a conductivity no >0.28 Btu-in/(h-ft2-degrees F).

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

1. 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.
2. 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.
3. Each heating or cooling system serving a single zone must have its own temperature control device.
4. Each humidification system must have its own humidity control device.
5. 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 coolingb) capable of automatically setting back or shutting down systems during unoccupied hours using 7 different day schedulesc) have an accessible 2-hour occupant overrided) 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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 and shall be marked '181A-P' for pressure sensitive tape,'181A-M' for mastic or '181A-H' for heat-sensitive tape. Tapes and mastics used to seal flexible air ductsand flexible air connectors shall comply with UL 181B and shall be marked '181B-FX' for pressure-sensitive tape or'181B-M' for mastic. Unlisted duct tape is not permitted as a sealant on any metal ducts.
11. 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.
12. 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 actionsb) equipment operation and maintenance manualsc) 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 commentsd) complete narrative of how each system is intended to operate.
13. 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.
14. 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.
15. 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.

Permit #

Permit Date

COM*check* Software Version 3.2.0

Mechanical Compliance Certificate

2004 IECC

Report Date: 02/05/07

Data filename: C:\Program Files\Check\COMcheck\06095.cck

Section 1: Project Information

Project Title: Hughes Supply

Construction Site:
2140 W. Williams Drive
Phoenix, AZ

Owner/Agent:
Tom Porter
Yellowknife Building Systems, Inc.
815 N. Alamo Circle
Mesa, AZ 85213
(480) 539-8986

Designer/Contractor:
Brian Spotts
Johnston Engineering Co.
9777 N. 91st St., Ste. 100
Scottsdale, AZ 85258
(480) 443-8773
design@jechvac.com

Section 2: General Information

Building Location (for weather data):	**Phoenix, Arizona**
Climate Zone:	**2b**
Heating Degree Days (base 65 degrees F):	**1350**
Cooling Degree Days (base 50 degrees F):	**8425**
Project Type:	**New Construction**

Section 3: Mechanical Systems List

Quantity	System Type & Description
4	HVAC System 1: Split System Heat Pump, Cooling Capacity <65 kBtu/h, Air-Cooled Condenser / Single Zone
1	Instantaneous Water Heater 1: Electric Instantaneous Water Heater, Capacity: 1 gallons

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: Instantaneous Water Heater 1 :

☐ 1. Heat traps in inlet/outlet fittings
☐ 2. 1/2-in. insulation on 8 ft of inlet/outlet piping if no integral heat traps

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. Mechanical fasteners and sealants used to connect ducts and air distribution equipment
☐ 10. Ducts sealed - longitudinal seams on rigid ducts; transverse seams on all ducts; UL 181A or 181B tapes and mastics
☐ 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

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 2004 IECC requirements in COM*check* Version 3.2.0 and to comply with the mandatory requirements in the Requirements Checklist.

Brian Spotts — Principal Mechanical Designer-Name
Signature
5/2/07 — Date

Project Notes:
Water heater is an instantaneous type, 0 gallons storage.

CHVAC: Full Commercial HVAC Loads Calculation Program — Elite Software Development, Inc.
Johnston Engineering Co — Hughes Supply
Scottsdale, AZ, 85258 — Page1

Building Summary Loads

Building peaks in August at 2pm.

Bldg Load Descriptions	Area Cu-ft	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Roof	4,050	10,105	13.41	0	5,598	5,598	3.85
Wall	1,666	7,696	10.22	0	4,675	4,675	3.21
Glass	217	7,626	10.12	0	17,946	17,946	12.34
Floor Slab	0	0	0.00	0	0	0	0.00
Skin Loads		25,427	33.75	0	28,219	28,219	19.40
Lighting	8,100	0	0.00	0	29,022	29,022	19.95
Equipment	6,537	0	0.00	0	23,419	23,419	16.10
People	34	0	0.00	7,055	8,819	15,875	10.91
Partition	309	487	0.65	0	649	649	0.45
Cool. Pret.	0	0	0.00	0	0	0	0.00
Heat. Pret.	0	0	0.00	0	0	0	0.00
Cool. Vent.	992	0	0.00	6,172	34,597	40,769	28.03
Heat. Vent.	992	45,291	60.12	0	0	0	0.00
Cool. Infil.	0	0	0.00	0	0	0	0.00
Heat. Infil.	0	0	0.00	0	0	0	0.00
Draw-Thru Fan	0	0	0.00	0	0	0	0.00
Blow-Thru Fan	0	0	0.00	0	0	0	0.00
Reserve Cap.	0	0	0.00	0	280	280	0.19
Reheat Cap.	0	0	0.00	0	0	0	0.00
Supply Duct	0	2,919	3.88	0	4,806	4,806	3.30
Return Duct	0	1,215	1.61	0	2,403	2,403	1.65
Misc. Supply	0	0	0.00	0	0	0	0.00
Misc. Return	0	0	0.00	0	0	0	0.00
Building Totals		75,339	100.00	13,227	132,215	145,442	100.00

Building Summary	Sen Loss	%Tot Loss	Lat Gain	Sen Gain	Net Gain	%Net Gain
Ventilation	45,291	60.12	6,172	34,597	40,769	28.03
Infiltration	0	0.00	0	0	0	0.00
Pretreated Air	0	0.00	0	0	0	0.00
Zone Loads	25,914	34.40	7,055	90,408	97,464	67.01
Plenum Loads	0	0.00	0	0	0	0.00
Fan & Duct Loads	4,135	5.49	0	7,210	7,210	4.96
Building Totals	75,339	100.00	13,227	132,215	145,442	100.00

Check Figures:		
Total Building Supply Air (based on a 20° TD):	4,549	CFM
Total Building Vent. Air (21.81% of Supply):	992	CFM
Total Conditioned Air Space:	4,050	Sq.ft
Supply Air Per Unit Area:	1.1232	CFM/Sq.ft
Area Per Cooling Capacity:	334.1731	Sq.ft/Ton
Cooling Capacity Per Area:	0.0030	Tons/Sq.ft
Total Heating Required With Outside Air:	75,339	Btuh
Total Cooling Required With Outside Air:	12.12	Tons

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date
September 2006
drawn by
Brian

NATIONAL WATER WORKS
NORTH PHOENIX BRANCH
Parcel #209-03-104 A
2140 W Williams Drive
Phoenix, Arizona

CITY OF PHOENIX
Development Services Department
BY: ACAS (ANTHONY GASCA)
MAY 23 2007
This set of plans has been reviewed for PLUMBING/MECHANICAL requirements prior to issuance of Building Permit and shall be kept on job construction site. Such review shall not prevent the Building Official from requiring correction of errors in the plans where such errors are subsequently found to be in violation of any law or ordinance.

job number
0658
title
IECC CODE COMPLIANCE

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. EXPIRES
22374
THOMAS W. JOHNSTON
5/2/07
ARIZONA, U.S.A.

JEC PROJECT NO. 06095

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sheet number
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