

San Diego Gas and Electric Energy Resource Center

Thursday, October 15, 2009

CHPS Best Practices Vol VI
Relocatable Classroom
Overview Of Environmental Topics
(The High Points)

Collaborative for High Performance Schools

The Collaborative for High Performance Schools (CHPS®) began in November 1999, when the California Energy Commission called together Pacific Gas and Electric Company, San Diego Gas and Electric, and Southern California Edison to discuss the best way to improve the performance of California's schools. Charles Eley was instrumental in the formative years of CHPS.

Out of this partnership, CHPS grew to include a diverse range of government agencies, utility companies, school districts, non-profit organizations and private companies, all with a unifying goal: to improve the quality of educational facilities for California's children.

With the successful launch of the Best Practices Manual in 2001, interest in high performance design grew, and CHPS expanded its focus beyond California, developing a national version of the manuals as well as other state-specific versions. In early 2002, CHPS incorporated as a non-profit organization, further solidifying its commitment to efficient, environmentally sound, and healthy design that enhances the educational environment for all schoolchildren.

Best Practices Manual

The CHPS Best Practice Manual consists of six volumes and are supported by the CHPS web site (www.chps.net), which contains research papers, supporting documents, databases, and other information that compliments the Best Practice Manual volumes.

Volume VI: High Performance Relocatable Classrooms.

This volume provides a guide to the CHPS specification for high performance relocatable classrooms. Related issues such as placement on the site, applicable codes and the procurement process are covered to ensure that all new relocatable classrooms are efficient and good learning environments.

A Few Of The Topics

- HVAC System
- Noise
- IEQ
- Relating To, But Not Including Daylighting

Bid Specs – Prerequisites

The Basics

3.9 HVAC

Single Heat Pump Unit

- Type I, II Buildings 92 deg Smr, >10 deg Wntr
- Type III Building 92 deg Smr, <10 deg Wntr

Two Heat Pump Units

- Type IV Building 114 deg Smr, >10 deg Wntr

- Other Units such as Gas/Elec, Upon Approval

Bid Specs – Prerequisites

The Basics

3.9.1.3 HVAC

- Basic Spec Is A Wall Mount Heat Pump

- ARI Std 390-2003 (Commercial)

 - For Single Package Vertical Unit

Bid Specs – Prerequisites

The Basics

3.9.1.3.1 HVAC Basic Efficiency

- Wall Mount

 - 14.5 IPLV (Integrated Part Load Value)

 - 2 Stage Compressor

 - Think Of It As An

 - Integrated or Average EER

Bid Specs – Prerequisites

The Basics

3.9.1.3.1 HVAC Basic Efficiency

- Roof Mount or Split System
- >15 SEER

ARI Std 210/240

Bid Specs – Prerequisites

The Basics

3.9.1.3.3 Ventilation

- Minimum 480 cfm OA (32 x 15 cfm)
- Constant Ventilation During Occupied Times
35 \pm 2 dbA Sound Pressure In Vent Mode
- T24 Prepurge Prior To First Occupant
- CO₂ Option 600ppm Above Outdoor Ambient

Bid Specs – Prerequisites

The Basics

3.9.1.3.5 Refrigerant

- R410a Required
- Mandatory Jan 1, 2010 Anyway
- CHPS Anticipated This

Bid Specs – Prerequisites

The Basics

3.9.1.5.2 Unit Compressor

- 2 Stage Compressor
- Change On The Fly Type

Bid Specs – Prerequisites

The Basics

3.9.1.7 Indoor Blower Motor

- ECM Type (Electronically Commuted Motor)
- PSC Motor Uses 135 Motor Watts More Than An ECM Motor
- Even Great Savings- Cut ECM Speed In Half And Power Consumption Drops By Factor of 8.

Bid Specs – Prerequisites

The Basics

3.9.1.12 Filtration

- MERV 8 2” Pleated
(Minimum Efficiency Reporting Value)
- Filter Pressure Gauge
(Dirty Filter)

Bid Specs – Prerequisites

The Basics

3.9.1.14 Auxiliary Heat Strips

-Building Type I, II, IV 10kw

-Building Type III 20kw (Snow Load)

125 amps

Bid Specs – Prerequisites

The Basics

3.9.16 Economizer (Ventilation Option)

- Provides Free Cooling Under Specific ConditionsAt The Same Time
- Outdoor Air Under 50% RH
- Outdoor Air Under 55 deg
- Must Still Meet Minimum 480 cfm OA

Bid Specs – Prerequisites

The Basics

3.9.2.1 Ducting

- Flex
- Galvanized
- Ductboard

Bid Specs – Prerequisites

The Basics

3.9.9.2.2 Distribution (Registers)

- Minimum Three 16x16
non OBD
non Perforated Face Diffusers
- Dampers At Supply Plenum
- Noise Criteria (NC) 25
- Lined Side Outlet Box Behind Diffuser

Bid Specs – Prerequisites

The Basics

3.9.3 Thermostats

- Programmable Vent Cycle
- 3 Heat Stages
- 2 Cool Stages
- LonWorks or BacNet Capability

Bid Specs – Prerequisites

The Basics

3.9.4 CO₂ Sensor (Option)

-Use with

Classroom Ventilator

Energy Recovery Ventilator

not Economizer

-Suggest: Single Gang Elec Box w/Conduit From Stat

Bid Specs – Prerequisites

The Basics

3.9.5 Air Balance

- Set cfm Of Supply, Return, Outside Air

- 15 cfm Per Occupant

- Who Does It?

Bid Specs – Prerequisites

The Basics

3.9.6 Noise

- 45 dbA maximum

- Site Ambient (outdoor) Noise Affects This

- Other Optional Noise Reducing Options Avail

 - Iso Curbs,

 - Acoustical Supply/Return Plenums

 - What's Possible? 35 dbA

The CHPS Scorecard

EE1.0 Minimum Energy Performance

Must Be At Least.....

-Calif : 15% Better Than T24

-All Other: 30% Better Than ASHRAE 90.1

-Up To 15 Points More Available

-But It's APie!

The CHPS Scorecard

EE1.2 Energy Conservation Locks

- Door / Window Locks

- 1 Point

- Must Be Installed Correctly To Interface With HVAC Unit: example- time delay.

The CHPS Scorecard

EE1.3 Natural Ventilation

-Tough To Guarantee 480 cfm Ventilation

The CHPS Scorecard

EE1.4 EMS

- Programmable Stat
- Occupancy Based Stand Alone Controller
- DDC System 1 Point

The CHPS Scorecard

EQ1.1 Daylighting (from the hvac perspective)

- Magnificent
- Be Careful Of Back Window View Credit?
- Sola Tube
- High Side Windows

The CHPS Scorecard

EQ2.0A Minimum HVAC & Construction IEQ

- 4 Pages Of Prerequisitetoo much to go over now.....read while watching game 7.

The CHPS Scorecard

EQ2.0C Minimum Filtration

-MERV 8

The CHPS Scorecard

EQ2.1 Enhanced Filtration

-MERV 11 1 Point

-MERV 13 2 Point Probably 4"

-Higher MERV

Cost Of Filter Higher

Increase Energy Cost

More Frequent Filter Change

-Better IEQ For Kids

The CHPS Scorecard

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The CHPS Scorecard

EQ2.3 Ducted Return

- 1 Point

The CHPS Scorecard

EQ2.4 Thermal Displacement Ventilation

- Up and Comer

- Expensive Now

- Different Feel Than What We Are Used To.

The CHPS Scorecard

EQ2.5 Controllability Of System

- EQ2.5.1 Operable Windows

- EQ2.5.2 Individual HVAC Control Per Classroom

- EQ2.5.3 Individual OA Ventilation System Per Classroom

The CHPS Scorecard

EQ3.0 Minimum Acoustical Performance

-Prerequisite 45 dbA .6 Reverb Time

-35-40 dbA 1-3 Points Available

-With CHPS Wall Mount Spec And Added
Optional Acoustical Accessories...

35dbA Is Obtainable From The HVAC
System Depending On Site Ambient

Conditions.

Questions?

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Thank You.....