Errata to
AEDG for K-12 School Buildings
March 18, 2008

3-03-08 **Page 48:** Corrected mislabeling of Colorado counties as California counties under Zone 6 climate map.

3-18-08 **Pages 34, 37, and 40:** Corrected SRI values. Updated from 0.78 to 78.

Errata to
Advanced Energy Design Guide for K-12 School Buildings
January 5, 2010

Page 142: In the second bullet under the HV16 heading, change the first sentence from "Supply ductwork..." to "Supply **and return** ductwork..." and delete the second sentence.

Page 151–52: There are a number of changes that need to be made to section AS1; the entire section is reproduced below with changes indicated in red.

AS1 Electrical Distribution System (Climate Zones: all)

Energy-efficient distribution transformers should be provided in all construction/repair projects: new construction, renovation, or replacement. ~~Minimum transformer specifications as of January 1, 2007, are classified by~~ The Energy Policy Act of 2005 (EPACT 2005) established minimum energy efficiency standards for low-voltage, dry-type distribution transformers and specifies that any such transformer manufactured after January 1, 2007, "shall be the Class I Efficiency Levels for distribution transformers specified in table 4-2 of the 'Guide for Determining Energy Effciency for Distribution Transformers' published by the National Electrical Manufacturers Association (NEMA TP-1-2002)." These specifications are referred to by DOE as TP-1 and are the lowest efficiency available today. Energy-efficient transformers that are roughly 30% more efficient than the minimum TP-1 were classified by DOE as CSL-3 (Candidate Standard Level 3) in the July 29, 2004, ANOPR (Advanced Notice of Proposed Rulemaking) for energy conservation standards for distribution transfomers. It is recommended that all low-voltage, dry-type distribution transfromers (single-phase or three-phase) used in K-12 school construction meet the CSL-3 efficiency specifications.

The size of an educational building is a contributing factor in the determination of the electrical voltage service brought into the building. Electrical service from the utility in smaller schools is usually 120/208 three-phase voltage and in larger schools 277/480 three-phase voltage. When the 277/480 volt service is provided, 120/208 volt dry step down transformers are placed in key locations in the building to provide the power to the electrical outlets throughout. Electrical distribution systems in today's schools contribute to the energy inefficiency. The following good practices will help improve the energy efficiency of the electrical distribution system.

Electrical Service Voltage. School facilities smaller than 40,000 ft^2 should design the incoming electrical service from the utility for 120/208 V. Schools facilities larger than 40,000 ft^2 should have the incoming electrical service designed from the utility at 277/480 V. This design will require the placement of internal step down dry transformers 277/480 V to 120/208 V to provide the needed power for the plug load.

Energy-Efficient Transformers. DOE recognizes that current step-down transformers contribute to energy waste throughout the country. The use of the CSL-3 ~~standard has been established to~~ efficiency classification will improve the energy efficiency of distribution transformers. This ~~standard~~ efficiency classification recognizes the low loading, especially in schools, and the no-load losses with current transformer design. The ~~standard~~ CSL-3 design eliminates any impact for normal harmonics created by the loads in the school. Concentrating all larger computer loads on one transformer can be handled by a variation in the CSL-3 design and still keep the required efficiencies and no-load losses. The ~~standard~~classification includes specifics on the no-load losses for specific sized transformers and specific percent efficiencies at given loadings. For example, a CSL-3 75 KVA 277/480 to 120/208 volt transformer maximum no load loss is 170 W/h versus the ~~current~~pre-2007 industry average of more than 850 W/h. This same transformer will meet or exceed 98.4% efficiency at one-sixth loading. The efficiency of the standard pre-2007 transformers ~~currently~~ specified at one-sixth loading is 80% to 85%. This is an unregulated load at this time.

Specification of Energy-Efficient Transformers. Energy-efficient transformers should be specified using DOE's CSL-3 ~~Standard~~classification efficiencies as the basis. Specifications must include maximum no-load losses for specified transformers sizes and percent efficiency at 16.7% loading. A statement should be included in the specifications that requires the bid submission to include test data for the transformers being provided.

Electrical distribution equipment is usually provided by one supplier. This means the cost of the transformer is "buried" in the electrical distribution equipment price. The following statement should be included in the bid specifications: "The bid price for the dry distribution transformers specified (277/480 to 120/208 V) must be identified (priced) separately within the electrical bid and cannot be included in the bid pricing for other electrical distribution equipment that falls under Section 16 of the Standard AIA Specification Structure. The bid should include individual pricing as well as transformer bill of material pricing. If specified transformers are not separately identified in the bid pricing then the entire bid will be disqualified."