BSR/ASHRAE Addendum d
to ANSI/ASHRAE Standard 90.4-2019

Public Review Draft

Proposed Addendum d to Standard 90.4-2019, *Energy Standard for Data Centers*

First Public Review (March 2020)
(Draft Shows Proposed Changes to Current Standard)

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Foreword

Interpretation IC 90.4-2016-1-OF of ANSI/ASHRAE Standard 90.4-2016 Energy Standard for Data Centers was approved on 1/8/2020. This IC was a response to a Request for Interpretation on the 90.4 consideration of Diesel-Rotary UPS Systems (DRUPS) and the corresponding accounting of these systems in the Electrical Loss Component (ELC). In crafting the IC, the committee also identified several marginal changes to 90.4 definitions and passages in Section 8 that would add further clarity to the issue. This addendum contains the proposed changes for that aim as well as other minor changes to correct spelling or text errors, incorporating the latest ELC values into Section 11, and to refresh information in the Normative Reference section of the Standard.

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and strikethrough (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum d to 90.4-2019

Modify the definition of Uninterruptable Power Supply (UPS) as follows:

Uninterruptable Power Supply (UPS): (also referred to as Uninterruptible Power *System*) a *system* intended to deliver continuous, stable power to the critical load. . . . . and (b) "rotary", in which incoming AC power drives a propulsion unit that turns a generating device, with a heavy flywheel storing kinetic *energy* that continues to turn the generating portion when incoming power fails or anomalies occur. It may also include a driven engine for emergency backup (commonly referred to as a Diesel Rotary *UPS* or "DRUPS", regardless of *fuel* type), which is decoupled from the rotary *UPS* components during normal operation and is not included in *efficiency* calculations. Either type can be made up of one or more modules . . . .

Modify the language in sub-sections 8.4.1.4 and 8.4.1.8 as follows:

Exception to 8.4.1.4 Incoming Electrical Service Segment: Emergency or stand-by power *systems* are not considered a part of the *incoming electrical service segment*, with the exception of individual elements such as associated transfer switches, *transformers*, or other devices that are also included between the *design ELC demarcation* and the *UPS*. DRUPS *systems* shall be calculated as part of the *UPS Segment* with the engine element decoupled.

8.4.1.8 Alternate Designs. In the event that a conventional *UPS* is not used in the design, the incoming and distribution segments shall meet at the point(s) where a *UPS* would logically be inserted under normal operating conditions. Where another device, such as a rectifier, voltage regulator or harmonic neutralizing *transformer*, is used in place of ~~the~~ a conventional *UPS*, or where a DRUPS *system* is used, the *efficiency* and *loss* for that device shall be used in the *efficiency* calculation in the same manner as that defined for a *UPS*. In the case of a DRUPS *system*, this shall be with the engine decoupled. DRUPS operation under engine-generator power shall be considered a short-term emergency condition and is excluded from the requirements of this Standard in the same manner as are other generators. (See Exception under 8.4.1.4.)"

Correct all instances of "Uninterruptible Power Supply" to the commonly accepted spelling.

Uninterrupt~~a~~ible Power Supply (UPS)

Update the Normative References as shown below; Standard 169 was updated in 2016 and includes the necessary climate information and the Thermal Guidelines reference is already made in Appendix A.

NORMATIVE REFERENCES

Reference	**Title**
ASHRAE **1791 Tullie Circle NE** **Atlanta, GA 30329-2305, United States** **1-404-636-8400; www.ashrae.org**	
…	…
ANSI/ASHRAE Standard 169 (201~~3~~6)	Climatic Data for Building Design Standards
~~R.S. Briggs, R.G. Lucas, and Z.T. Taylor (paper)~~	~~Climate Classification for Building Energy Codes and Standards Part 1 – Thermal Guidelines for Data Processing Environments~~

Update the Examples portion of 11.2 to incorporate the current ELC values:

Examples

For a ~~particular design~~ *data center* in Climate Zone 1A with a single-feed *UPS* at 100% load and *Data Center ITE Design Power >300 kW*, the maximum MLC = 0.260 from Table 6.5, and the maximum ELC = ~~0.297~~0.245 from Table 8.5. Adding the two values together provides a maximum overall *systems* design value of ~~0.557~~0.505.

Maximum MLC Value [0.260] + Maximum ELC Value [~~0.297~~0.245] =Maximum Overall *Systems* Value [~~0.557~~0.505]

If the electrical *system* design produces a *design ELC* of ~~0.328~~0.276, which exceeds the maximum ELC value, a more efficient mechanical *system* can be used to offset this. If the mechanical *system* had an *annualized MLC* of 0.190 then the overall *systems* design value would be less than the maximum overall *systems* design value and would demonstrate compliance with the standard.

Annualized MLC Value [0.190] + *Design ELC* Value [~~0.327~~0.276] = Overall *Systems* Design Value [~~0.517~~0.466]