

Stakeholder feedback:

The “Thermal Information” in manufacturers’ PPDS’s from Energy Star Version 1 should be improved to make the data more useful for its intended purpose: to provide data center planners with information needed for designing an energy efficient cooling infrastructure.

- ITEM 1: The “Delta Temperature at Exhaust at Peak Temp” has not, unfortunately, been as useful as hoped. Consider removing this row. When the data center planner knows power and airflow for a given condition (utilization, temperature), the delta T can be calculated if needed. Unfortunately the Version 1 data is unclear regarding whether the delta T occurs at a high or low utilization or airflow. Also, it is unclear whether any of the power dissipation values reported in the PPDS corresponds to any of the airflow values in the Thermal Information. See Item 3.
- ITEM 2: As an alternative to delta T, if manufacturers are willing to report a “Maximum Temperature at Exhaust” under worst case conditions, this would be useful so data center planners can estimate the worst case hot aisle temperature or consider how extreme exhaust temperatures might impact power strips, cabling, cable managers and other items exposed to hot exhaust air. We suspect that this “worst case” condition does not necessarily occur at max utilization and max inlet temperature, as fan speeds may have increased.
- ITEM 3: It would be useful to report power and airflow together for three key conditions used in CFD analysis and cooling system design:
- Idle Condition. We are assuming this produces lowest power dissipation and lowest airflow, but other stakeholders may have better advice.
 - Typical/Nominal Condition. The workload for "Typical / Nominal" condition would need to be determined. Perhaps EnergyStar should specify a SERT workload such as 50% using ssj. Other stakeholders may have better advice.
 - Max Airflow Condition. We are assuming that this occurs at maximum temperature and maximum utilization of components including CPU and memory, but other stakeholders may have better advice.

A proposed format for this data is provided in **red text** in the Thermal Information section of “Servers Version 2.0 Draft PPDS Template-ThermalChanges.xlsx” tab “Product Family (ThermalChanges)”.

*In lieu of actual test data, we would also consider “expected” values for the requested power and airflow values at Idle, Typical/Nominal and Max Airflow to be sufficient to enable the data center planner to model servers and design an energy efficient cooling infrastructure. If “expected” or calculated values are used instead of measured test data, we still prefer the new table format shown in **red text** in the Thermal Information section of “Servers Version 2.0 Draft PPDS Template-ThermalChanges.xlsx” tab “Product Family (ThermalChanges)”.*

- ITEM 4: As server technologies improve, it is conceivable that new algorithms would cause airflow (for a fixed workload) to change as the temperature changes within the 18 to 27 C window specified by Version 1. Such changes can have a significant impact on cooling strategy and energy consumption. Therefore it would be useful to data center planners if the Thermal

Information could provide more detail about the temperature at which the reported airflow occurs. For example, instead of saying “nominal temperature is defined as 18 – 27 C” the PPDS could ask for airflow at a specific temperature such as 22C (halfway between 18 and 27C and comfortably below 25 C, which is a common transition point for increasing airflow). Other options would be 20C (mentioned in ASHRAE) or 25C (used by Dell as a default in their online calculator, but less desirable because this is a common transition point for increasing airflow).

ITEM 5: The reference to ASHRAE has been updated in the “Servers Version 2.0 Draft PPDS Template-ThermalChanges.xls” footnote to match the most recent edition of the Thermal Guidelines.

Note about stakeholder’s intent (ASHRAE): If there is concern that this request does not exactly match what is requested in Thermal Reports according to the ASHRAE Thermal Guidelines, please consider engaging ASHRAE TC9.9 on this topic. Energy Star’s efforts to establish SPEC SERT workloads for energy reporting are revealing some areas where the ASHRAE Thermal Reports can perhaps be updated / improved. Perhaps ASHRAE TC9.9 and Energy Star can collaborate to a point of harmonization between an improved PPDS Thermal Information section and an updated ASHRAE Thermal Report format.

Note about stakeholder’s intent (proprietary nature of airflow control): Airflow for recent energy efficient servers is typically controlled using proprietary algorithms based on component utilization / workload and temperature (at inlet and/or component). We understand that asking for too much information in the PPDS Thermal Information may expose more information than server manufacturers want to reveal. For example, ideally the data center planner would like to know how airflow and power dissipation change as temperature increases from 18 C to 35 C for a given workload (for energy efficiency purposes). However, we have restrained from asking for this because we doubt that server manufacturers want to reveal this much information. What we have proposed is intended to be a more reasonable request that we hope will satisfy both the data center planners and the server manufacturers. We invite further collaboration to arrive at a solution agreeable to both parties.