July 8, 2024

Mr. Davide Polverini
Policy Officer
DG GROW
Avenue d'Auderghem 45
1040 Brussels, Belgium

Re:     Committee for the Study for the review of Commission Regulation 2019/424 (Ecodesign of
        Servers and Data Storage Products) Task 6 Design Options – Draft June 2024

Dear Mr. Polverini:

In response to your request for technical assistance from ASHRAE, I am writing on behalf of
ASHRAE Technical Committee 9.9, *Mission Critical Facilities, Data Centers, Technology Spaces
and Electronic Equipment*.

ASHRAE, founded in 1894, is a global professional and technical society of nearly 54,000 members
from around the world. ASHRAE focuses on building systems, energy efficiency, indoor air quality,
refrigeration and sustainability. Through research, standards writing, and continuing education,
ASHRAE shapes tomorrow's built environment today. ASHRAE's Technical Committees (TCs)
consist of people who have a recognized proficiency in a specific field of interest and are responsible
for preparing the text of ASHRAE Handbook Chapters and advising ASHRAE on all aspects of the
technology of each TC's focus.

ASHRAE TC 9.9 is concerned with all aspects of mission critical facilities, technology spaces, and
electronic equipment/systems. This includes data centers, computer rooms/closets, server rooms,
raised floor environments, high-density loads, emergency network operations centers, telecom
facilities, communications rooms/closets, and electronic equipment rooms/closets. One of the TC's
flagship publications is the *Thermal Guidelines for Data Processing Environments*, which was first
published by ASHRAE TC 9.9 in 2004 with the most recent fifth edition published in 2021. The
*Thermal Guidelines* have become the global de-facto industry standard for the data centre industry.
We encourage the EU Commission to remain conscious of the velocity of evolution in the
technology and data centre industry and how any proposed legislation could quickly become
outdated, obsolete, or worse, stifle innovation.

This letter provides technical input from ASHRAE TC 9.9 on the June 2024 draft of the European
Commission's Regulation 2019/424.  **Please note that this input is based on the professional
judgement of the members of ASHRAE TC 9.9 and does not constitute ASHRAE policy or
positions.**

With respect to the June 2024 Draft Commission Regulation 2019/424 (Ecodesign of Servers and Data Storage Products) Task 6 Design Options, TC 9.9 offers the following comments:

**Section 6.1.6.1 Data Sharing – Server thermal management and monitoring**

*We would agree that the release of temperature and fan activity should be made available and as stated that the fan speed should not be overridden from outside the server controls. In most cases the algorithms that are developed by the IT manufacturer are proprietary and are such that the fan speeds are tied to many of the operating and performance characteristics of the server in order to maximize performance while maintaining components within allowable temperature limits.*

**6.1.8 Other measures not taken forward:**

**Liquid Cooling**

*Liquid cooling products offered by the IT manufacturers have greatly increased over the last couple of years due to the rapid increase in CPU/GPU chip powers. Although, in general liquid cooling can be viewed as a 'niche market' considering all categories of the server market, but when one looks at AI and the scientific computing area it is exploding by every measure reported in the IT industry. ASHRAE committee TC 9.9 which includes many of the IT manufacturers (CPU/GPUs and servers) has emphasized the growth rate of these products and the committee is focused on preparing guidelines and documentation to support this rapid growth.*

*Liquid cooling has traditionally been reserved for high performance computing and other more niche use cases just a few short years ago. However, the rush to deploy AI-ready infrastructure, combined with the evolution of compute platforms, has pushed liquid cooling into the mainstream. With chips dissipating greater than 300 watts in 2021, Lenovo, Dell and HPE developed liquid cooled products to deliver these server products to clients that required the performance. And by every measure these liquid cooled products perform more energy efficiently than the air-cooled counterparts.*

*AI applications need a lot of processing power to perform operations like data analysis, machine learning, and deep learning. These workloads produce an enormous amount of heat, so effective cooling solutions are required. Liquid cooling in data centers makes it possible to effectively remove heat from AI servers ensuring peak performance and dependability. To support the changing demands of modern data centers, data center liquid cooling is driven by the requirement for increased cooling efficiency, energy saving, scalability, sustainability, and higher performance.*

**Setting minimum operation range requirement to be ASHRAE A2 (or ban A1)**

*Operating air-cooled servers at a minimum within the A2 environment could be achievable but at the risk of limiting computing performance. ASHRAE TC 9.9 is fully aware of servers being designed to handle the AI workloads. With predictions of huge AI workloads along with associated power increases achieving the temperatures for these loads could require a reduction of the ambient temperatures within the data center for any air-cooled products. This has been anticipated and ASHRAE TC 9.9 has added a lower temperature environmental envelope (H1 in the most recent Thermal Guidelines book – 5<sup>th</sup> edition). The maximum recommended for this H1 environment is*

*22°C with a maximum allowable of 27°C. The TC 9.9 IT team made up of many engineers from IT manufacturers have expressed the need to offer this lower temperature limit to continue to offer air cooled products. See Section 2.2.2 in the 2021 Thermal Guidelines datacom book for more details on this H1 environmental envelope.*

*As stated in the referenced document the recommended maximum ambient temperature is 27°C.  This envelope was chosen based on several inputs, the primary being the reliability of the ITE, power increases of ITE with higher data hall ambient temperatures, acoustical impacts with higher data hall ambient temperatures, and providing a buffer for excursions to the allowable limits caused by facility cooling failures. Operation of servers beyond the recommended range up to the allowable temperature limits are permitted (with the associated warranties) and the server performance is still guaranteed with the knowledge that reliability might be comprised. For example, it may be desirable to allow the ambient temperature within the data hall to increase above the recommended max limit for short periods of time during hotter summertime conditions. The impact on reliability would be the first concern and realizing this the IT subcommittee generated the reliability impacts (x factor) of higher temperature on servers. See Table 2.6 in the 5<sup>th</sup> ed. Thermal Guidelines book. As reported in this book the hardware fails in a data center operating at 20°C are approximately 2%. By increasing the data center temperature to 30°C the failure rate increases by 42% such that the hardware fail rate would increase from 2 to 2.8%, with most data center operators considering this slight increase acceptable.*

*As an aside two hyperscalers have raised their data center operating temperatures to 29°C and 32°C most probably based on the data they have collected on their servers that show these temperature setpoints are acceptable for the reliability levels achieved.  The Thermal Guidelines book outlines the process for setting a different temperature other than the 27C recommended in the Thermal Guidelines book. See section 2.4 in the Thermal Guidelines book that outlines this process.*

To improve access to ASHRAE 9.9 publications, we have transitioned to an online subscription of all the datacom books and technical publications. For a small annual subscription cost all this information is now available online.  More information about this subscription can be found here: https://www.ashrae.org/technical-resources/bookstore/datacom-series

We also want to call to your attention to ANSI/ASHRAE Standard 90.4-2022, *Energy Standard for Data Centers,* which offers a framework for the energy efficient design of data centers with special consideration to their unique load requirements compared to other buildings. This includes the maximum mechanical load component (MLC) and electrical loss component (ELC) values required for compliance which have been lowered in recognition of the industry's changing technologies and improved efficiencies.  More information about this standard can be found here: https://store.accuristech.com/ashrae/standards/ashrae-90-4-2022?product_id=2524333

Thank you for allowing ASHRAE TC 9.9 to provide the European Commission with its comments regarding this document. ASHRAE would be happy to address any questions you might have. I have also attached a list of the TC9.9's IT Subcommittee member companies represented at ASHRAE conferences. Please feel free to contact me or have your staff contact GovAffairs@ashrae.org.

Sincerely,

Matt Koukl
Chair, ASHRAE TC 9.9


Enclosure: List of IT Subcommittee Member Affiliations

*Combined list of IT Subcommittee member companies represented in the IT meetings at 2024 ASHRAE Winter and Summer Conferences*:

AMD
Intel
Nvidia
IBM
Dell
SuperMicro Computer
Oracle
Google
DLB associates
Vantage Data Centers
Sequente
J.M. Gross Engineering
Parker
Continental
GRC
Arteco/ASTM
Iceotope
Valvoline
Chilldyne
nVent
ORNL
Schneider Electric
Cadence
Kao Data
Danfoss
Johnson Controls
Motivair