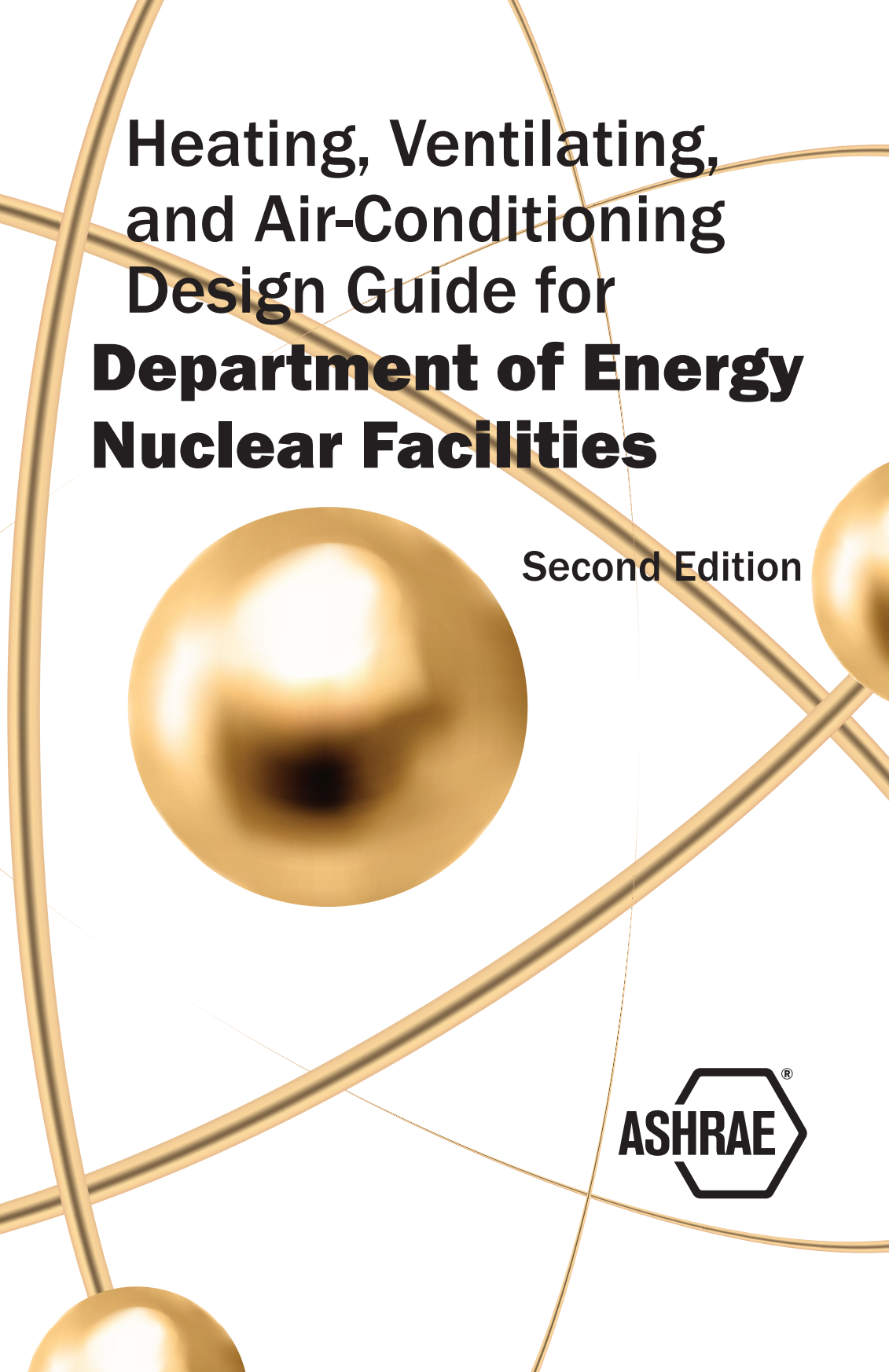
Heating, Ventilating, and Air-Conditioning Design Guide for **Department of Energy Nuclear Facilities**

Second Edition



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Peachtree Corners

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Preface

The purpose of this guide is to help ensure consistency in establishing the design basis for HVAC systems serving nuclear facilities. This design guide does not attempt to address all the additional requirements associated with nuclear safety management (e.g., 10 CFR 830 [NARA 2023a], DOE-STD-3009, and DOE-STD-1027) or quality assurance (e.g., DOE O 414.1D and ASME NQA-1); this information needs to be obtained from the site-specific project documents.

Any designs for U.S. Department of Energy (DOE) nuclear facilities must fulfill the requirements stated in DOE O 420.1C, *Facility Safety*, and 10 CFR 835, "Occupational Radiation Protection" (NARA 2023b). However, that order and its associated guide (DOE G 420.1-1A, *Nonreactor Nuclear Safety Design Guide for use with DOE O 420.1C, Facility Safety*) reference many documents, such as DOE-HDBK-1169-2003, *Nuclear Air Cleaning Handbook*; DOE-HDBK-1169-2022, *Handbook for use with DOE-STD-1269-2022*, *"Air Cleaning Systems in DOE Nuclear Facilities"*; DOE-STD-1269, *Air Cleaning Systems in DOE Nuclear Facilities*; DOE-STD-1066, *Fire Protection*; DOE-STD-3020, *Specification for HEPA Filters Used by DOE Contractors*; DOE-HDBK-1132, *Design Considerations*; the ASHRAE Handbook series; ASME standards; Nuclear Regulatory Commission (NRC) regulatory guides; and the American Conference of Governmental Industrial Hygienists (ACGIH) *Industrial Ventilation* manual. This design guide combines applicable information from all of these resources to provide HVAC guidance for design engineers. The intent is not only to state the DOE design requirements for HVAC systems in nuclear facilities but also to express some of the engineering judgment used in designing the systems.

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The second edition of this design guide was updated by members of the Subcommittee on Nuclear Facilities of ASHRAE Technical Committee (TC) 9.2, Industrial Air Conditioning and Ventilation. The effort was led by Scott MacMurray, Deep Ghosh, and Thomas Axley. The information in each chapter was obtained by researching DOE orders, technical documents, and site procedures and from discussions with experienced personnel at DOE sites.

This guide should be used by design agencies, liaison groups, health protection organizations, and other persons or groups involved in the design, installation, and operation of HVAC systems in nuclear facilities. This book is most effective when preparing design criteria for a project. By incorporating guidance from the relevant chapters of this book into the nuclear facility design criteria, this design guide can provide appropriate HVAC system design parameters that will fulfill the needs of the customer and satisfy code and regulatory requirements.

Although this book is considered a design guide, it should be understood that the information presented reflects both the current DOE requirements and the generally accepted requirements with respect to HVAC in nuclear facilities. However, the responsibility for satisfying applicable codes and regulations remains with the designer. All new project installations and future modifications should consider these design guidelines.

Since the original publication of this design guide, requirements for glove box fire suppression have been developed and published in DOE-STD-1066-2016, Paragraph 4.4.2.2, and NFPA 801-2020, Paragraph 7.1.4.5. Therefore, the information included in the former Glove Box Fire Suppression chapter has been omitted from the second edition.

Note that the sources cited throughout this guide typically do not include dates or revision numbers. It is the reader's responsibility to use the most recent edition of any referenced publication to ensure that they have the most current and applicable information available. In limited instances, a section or chapter of a particular publication may be referenced to best guide the reader to a specific area of interest; however, no section or chapter numbers are provided, as they may change in subsequent editions of the publications.

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