

ASME Code on Nuclear Air and Gas Treatment – AG-1 General Requirements, Section AA

By

Thomas J Vogan, Sargent & Lundy

Air cleaning standards have been in existence for many years. The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and the National Bureau of Standards were actively engaged in developing and producing such documents applicable to commercial and industrial air cleaning equipment and systems. The Department of Defense published standards and specifications for air cleaning protection equipment and systems for military use. In the late 1960's, when the nuclear power generation industry became a reality, there were no specific standards available covering air cleaning equipment and testing of the unique systems that were required to protect both plant personnel and the general public from potential radiological hazards.

In early 1971, the then Atomic Energy Commission staff met with a number of suppliers and engineers to review the various factors that affect the design of power plant systems, particularly standby gas treatment systems of boiling water reactors. Out of these meetings came a recommendation to form a group to prepare a standard covering the design, installation, maintenance and testing of standby gas treatment systems. The ANSI N45-8 Committee was established and assigned to ASME. Over the next couple of years, standards development activities recognized the need to expand the scope to include all nuclear air and gas treatment equipment and systems. In 1975, the ASME elected to transfer the responsibility to the Nuclear Codes and Standards supervision (now the Board on Nuclear Codes and Standards). The Committee on Nuclear Air and Gas Treatment (CONAGT) came into existence with the scope to prepare codes and standards for all engineered safety features air and gas treatment equipment and systems. The primary document that would contain these requirements was labeled the AG-1 Code. The Code contains a number of sections that provide requirements for the specific components used in air cleaning systems and the general requirements for all components and systems. These general requirements are contained in Section AA.

The current edition of the Code contains nine articles:

AA-1000	Introduction
AA-2000	References
AA-3000	Materials
AA-4000	Design
AA-5000	Inspection and Testing
AA-6000	Fabrication and Installation
AA-7000	Packaging and Shipping
AA-8000	Quality Assurance
AA-9000	Documentation

These articles provide a single location for general information. For example, a glossary of terms used in the air and gas treatment industry is maintained for the users to be consistent in the specification requirements and manufacturing processes. A listing of referenced documents that are important for integrating the AG-1 Code into the existing air cleaning industry standards and other important documents. As other technical societies that support the air cleaning industry update their standards and guides to reflect state of the art technologies, the appropriate application is incorporated into AG-1. Several years ago when it was determined that the laboratory test method for charcoal contained in ASTM D-3803 was potentially flawed, CONAGT worked with ASTM and the NRC to improve the ASTM standard. Integration of these requirements provided an overall improvement in the specification for charcoal.

25th DOE/NRC NUCLEAR AIR CLEANING AND TREATMENT CONFERENCE

Materials used in the construction of air cleaning components were originally left to the manufacturer's specifications. Application of these materials is now addressed in the specific component code sections. CONAGT currently expanding the materials requirements to incorporate allowable stress criteria for materials appropriate for the air and gas treatment industry.

Article AA-4000 is the heart of the AG-1 Code. This article contains the rules and methodology for design by analysis. It is not the intent of this discussion to review the specific design methodology of the Code, but to provide an overview of the design requirements organization of the Code. The general design service levels for air cleaning equipment are defined. The four service levels are analogous to the normal, upset, emergency and faulted conditions that were originally defined in the boiler and pressure vessel codes but appropriate to the equipment application. Once the service levels are specified, loading combinations and stress acceptance criteria are determined from the applicable tables in AA-4000. The general rules for the design of components contained in article AA-4000 are supplemented with specific requirements for components that are detailed in article 4000 of each of the component sections. This organization of design rules provides the user with the appropriate requirements for each type of component and assures consistency of requirements across the various components that make up the complete air cleaning systems.

The design of supports is addressed in detail in AA-4000. The Committee determined that the design rules of the AISC could generally be followed for the design of component and duct supports, but additional requirements were needed. Therefore, both the AISC and ASME Section III, Subsection NF rules were used as source requirement documents to establish methodologies, acceptance criteria and documentation for supports.

The balance of Section AA of the AG-1 Code articles provide the various general requirements for fabrication, testing, installation and quality of air cleaning equipment and systems. All of the general requirements of Section AA are supplemented by specific requirements detailed in each of the component sections.

At sessions such as this, feedback on the quality of the code and needs of the user is solicited. At a past presentation of the AG-1 Code, users questioned whether criteria for repairs and replacement of air cleaning equipment could be incorporated into the Code. As a result this feedback, the Committee has undertaken the development of a new Article AA-10000 that will incorporate the requirements for repair and replacement activities for components. These criteria are now in complete draft form and scheduled for publication in the 2000 edition of the Code.