FOREWORD

These duct construction standards are intended for use by contractors, fabricators, and designers of air pollution control, pneumatic conveyance, and industrial ventilation systems.

The 1977 edition of these standards was the first publication dealing with the selection of duct gage and reinforcing systems for industrial duct applications. While the first edition served industry very well for many years, technology has continued to move forward, and the Industrial Ventilation and Power Industry Task Force of SMACNA has responded to our membership’s request to expand and update the original text. We are taking their request one step further by restructuring the manual and providing supportive software to make the design process more “user friendly.” One of the main considerations in the development of the new standards is the opportunity to create a software program for personal computers that can greatly expand the computational capability of the user and permits an almost unlimited examination of different construction details and design solutions. A comprehensive review of the old procedures was completed and modifications implemented to update the technology and make the design procedures compatible with the computerization effort.

While the new procedures include many of the same assumptions as the original work, a number of new features have been added:

- Microsoft® Windows® based calculation software to expedite selection of construction details (software sold separately)
- Four different types of carbon steel and two different types of galvanized steel
- Seven different types of stainless steel alloys
- Four different types of aluminum alloys
- Design capability for high temperature systems up to 800°F (427°C), and higher with design review by a specialized professional
- Consideration of wind, snow, ice, and maintenance loads
- Expanded tables to include ducts to 96 in. (2440 mm)
- Expanded tables to include material up to ½ in. (12.7 mm) thickness
- All data presented in both English (Inch–Pound) and Metric (SI) units
- Expanded data for the selection of duct supports
- Chapter on the use of spiral lockseam pipe in industrial applications
- Accepted industry practice for round industrial ducts
- New Duct Class 5 for systems handling corrosives
- New chapter on welding
- New guide specification for the fabrication and installation of industrial duct systems
- Chapter of practical examples with step-by-step calculation instructions
- Chapter of flow charts to guide the user in design process

The Industrial Ventilation and Power Industry Task Force is greatly indebted to Dr. Michael C. Soteriades, who did the original work for the first edition and also provided the professional consultation and analysis necessary for the development of this new and expanded publication.
INDUSTRIAL VENTILATION AND POWER
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The SMACNA Industrial Ventilation and Power Industry Task Force develops and maintains standards for the design and construction of industrial ventilation and air pollution control systems and duct systems used in nuclear and fossil fuel power plants.

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1.1 SCOPE

The scope of this manual includes the determination of the necessary construction details for the fabrication and installation of round metallic industrial ductwork within the following general categories, and as further detailed in the scope of individual chapters, through a variety of both analytical and empirical methods:

- Fabricated using the longitudinal welded seam, grooved lockseam, and spirally generated lockseam techniques.
- From commercial grades of carbon, galvanized, or stainless steels, or aluminum of the various grades and types as described in Chapter 3.
- For a design pressure within the range from negative 30 in. wg (7500 Pa) to positive 50 in. wg (12,500 Pa).
- To be supported at intervals not exceeding 30 ft (9150 mm) for longitudinal welded seam pipe, and 20 ft (6100 mm) for spiral pipe.
- For a design temperature not exceeding the specific operating limits listed for each type and grade of metal included in Chapter 3.
- With a nominal diameter within the range of 4 to 96 in. (100 to 2440 mm)
- With a diameter-to-thickness ratio of less than 800 for all longitudinal seam ducts and 1800 for spiral pipe
- Listing of rated stiffeners, flanges, fasteners, hanger and support elements, and the methods for selecting them for specific structural loads.
- Catalogue of accepted industry practices for the fabrication and installation of round metallic industrial duct, with its fittings, appurtenances, accessories, insulation, cladding, hangers and supports.

1.2 PURPOSE

There were three primary purposes behind the development of this manual:

- To develop minimum standards for the fabrication and installation of metallic round industrial duct systems.
- To develop new, and collect existing, duct construction practices and data to serve as an authoritative source of accepted industrial practices for contractors, design engineers, facility managers, and pollution control authorities.
- To provide an authoritative source of documentation and terminology for operations involved in the construction and installation of round metallic industrial duct.

1.3 DEVELOPMENT OF THE SECOND EDITION

The objectives behind the development of this second edition of SMACNA’s Round Industrial Duct Construction Standards are to expand the scope of the first edition; update the theoretical basis for design; improve the presentation to make the expanded publication more “user friendly;” to cover both the simple, low or moderate temperature and pressure indoor systems, as well as the more complex outdoor systems, operating at moderate to high temperature and pressure, and subjected to higher and more complex external loading.

To achieve these objectives the following steps were taken:

- A professional review of the theoretical basis for the first edition was completed and a few recommendations for simplification of the math model and liberalization of the original safety factor were implemented. (For the range of diameters covered in the first edition 4 to 60 in. (100 to 1675 mm), the original safety factor (for negative pressure) was a function of diameter, and its value varied from 4 to 8; the safety factor adopted for the second edition is a constant 4.0, regardless of diameter.)
- Laboratory testing and data analysis on spiral lockseam pipe were completed to support the addition of this important fabrication technique to those already covered in the first edition.
- Material previously covered in broad terms was expanded through in-depth coverage. Whole new chapters were added covering...