

INDUSTRIAL INSIGHTS



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International Project Meets Nuclear Code Requirements

Nuclear Power Plant, Taiwan

Sheet Metal Contractor: AMS – Preferred Metal Technologies Inc., Burr Ridge, Ill.

Maintaining proper indoor air quality in an industrial setting is an issue of critical importance across the globe.

Initiated in 2001, AMS – Preferred Metal Technologies is completing the design and fabrication of 15 air filtration units for a nuclear power plant in Taiwan.

“The project presents an unusual challenge because there are five different unit styles that must be fabricated to meet the needs of various areas of the plant,” explained Allen Cutler, project manager.

Designed to meet the strict standards of the American Society of Mechanical Engineers (ASME) nuclear codes, the units ensure a safe environment within the plant by filtering radioactive particulate and gasses from the air. The internal components of the units include moisture eliminators, electric heaters, medium efficiency pre-filters, HEPA filters and charcoal absorbers to remove radionuclides from the air.

See **Meeting Nuclear Code Requirements** on page 2



Three air filtration units ready for shipment to Taiwan. Two of the units pictured are more than 30-feet long.

Meeting Nuclear Code Requirements

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In addition to fabricating the units, the contractor is performing extensive testing on each unit according to ASME standards. Filtration units, internal components and instruments are seismically tested and analyzed to verify they will withstand worst-case pressures and stresses in the event of an earthquake or plant accident. Internal components also receive extensive environmental testing to confirm the units will operate at extreme temperature and humidity levels as well as withstand exposure to high levels of radiation.

“When complete, this project will represent close to 32,000 man-hours of labor by our staff of union sheet metal workers, pipefitters and electricians,” commented Mr. Cutler.

The firm has delivered eight units as of August 2002 and expects to deliver another three units in September 2002 and the final four units in November 2002. ▼

On the Cover



Pictured are two of the five different styles of air filtration units fabricated at the AMS – Preferred Metal Technologies plant in Illinois. These units are ready for shipment to Taiwan on a freight vessel departing from Savannah, Ga.



Software Update

SMACNA Releases New Version 2.0 of Round Industrial Duct-Selection (RIDCS) Software

In addition to easing the many complicated calculations required in the selection of duct gage and reinforcement alternatives for industrial ducts, the newly released version 2.0 of SMACNA's Round Industrial Duct-Selection (RIDCS) Software now includes a spiral duct selection feature and extensive calculation report.

The software was developed by SMACNA Contractors to automate the duct selection process for complex systems consisting of multiple duct sizes, or when the design parameters fall outside the range covered by the tables, or for outdoor systems subject to wind, snow and ice loads, as the manual calculations can be challenging, as well as very time consuming, even for someone familiar with the calculation process.

However, the selection of duct for indoor systems having few or no changes in duct diameter can be conveniently and efficiently made from the tables presented in the manual.

The software helps designers of air pollution control and industrial ventilation systems create multiple, duct gage and reinforce-

ment alternatives from which to select the most attractive construction scheme. This design tool can handle the widest possible range of industrial duct applications from Class 1 industrial exhaust systems, to air conveying of particulates in Classes 2 through 4, and Class 5 systems handling corrosive vapors, fumes and aerosols.

The software enables the designer to consider negative working pressure, temperature, diameter of the duct, number and distance between supports, type of particulate being conveyed, various internal and external loads, duct orientation (horizontal or vertical) and other design requirements of the duct.

Organizing the Data Conveniently

The input data is conveniently organized so that it walks the user through the duct selection process. Since the terminology was suggested by contractors experienced in duct fabrication, the duct

*See **SMACNA Releases New Round Software** on page 3*

SMACNA Technical Manuals Now Available in PDF Format

Electronic copies of the technical standards and manuals developed by SMACNA may now be purchased in PDF format and downloaded instantly from www.smacna.org. SMACNA's more than 30 publications are also available in CD-ROM and traditional book formats.

The "publications store" link from SMACNA's homepage, www.smacna.org, offers visitors the opportunity to purchase and download SMACNA technical manuals and publications related to the sheet metal and air conditioning industry. Each publication listing features a comprehensive description, table of contents and an executive summary to assist customers in selecting the manual that best serves their needs. For the best results, SMACNA manuals should be downloaded using a high-speed Internet connection. Users with dial-up services have reported experiencing various problems while downloading using a telephone connection.

Featuring a secure ordering system, all SMACNA publications, may be purchased online. By choosing to download a selection at the time of purchase, visitors have immediate access to the SMACNA library and save the cost of shipping. CD-ROMs are available from IHS at (800) 854-7179. SMACNA's traditional books may be purchased either online or by calling (703) 803-2989. Fax credit card orders to (703) 803-3732.

Technical standards and manuals developed by SMACNA members have found world-wide acceptance by the construction community, including local and national government agencies. The American National Standards Institute (ANSI) has accredited SMACNA as a standards-setting organization and designated the "Seismic Restraint Manual: Guidelines for Mechanical Systems" (2nd edition) as an American National Standard. ▼

SMACNA Releases New Round Software

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selection is intuitive and easy, reducing the need to refer to the software instruction guide.

The software offers helpful tips that may be displayed throughout the duct selection procedures. This personal guidance is based on the collective experiences of numerous SMACNA Contractors who collaborated in developing the software package.

Speeding the Data Entry Process

The "drop-down windows" simplify the data input process by offering a straightforward choice from lists of typical values used in an otherwise complicated calculation process. To speed the data entry process, most design parameters have built-in default values, in addition to accepting the user's job-specific values, as long as they are within a predetermined range of maximums and minimums.

Factoring in Weather

When selecting duct for an outdoor system the designer must consider external loads caused by snow and ice accumulation, as well as that caused by wind. The data for calculating these loads are found in special maps published by the Civil Engineering Society and are available in PDF format on the software CD-ROM. (The electronic version is easier to read than the maps in the "Round Industrial Duct Construction Standards" manual, which are limited by print scale.)

About the Book

A copy of the second edition of SMACNA's "Round Industrial Duct Construction Standards" accompanies each purchase of the Round Industrial Duct-Selection (RIDCS) Software.

It is recommended that the software run on a computer having a Pentium based processor, but the minimum computer requirements are a 486 processor with a minimum clock speed of 66 MHz running Windows 95 or 98.

SMACNA members may purchase the new Round Industrial Duct-Selection (RIDCS) Software and the accompanying "Round Industrial Duct Construction Standards" manual for \$95 by contacting Information Handling Systems (IHS) at (800) 854-7179. The non-member price for the manual and software package is \$595.

Members may purchase the manual without the software for \$58. List price is \$189. Visit www.smacna.org to order or contact SMACNA's Publications Department at (703) 803-2989. ▼

Frequently Asked Question

Q: Does SMACNA publish a list of standard angle rings?

A: Standard angle rings are available from several manufacturers which could serve as a basis for standardization, although there are some minor variations.

Additionally, standard rings are limited to diameters from 3 to 50 inches and a maximum thickness of 3/16 inch.

A schedule based on one of the more common manufacturers could be created, but for diameters in excess of 50 inches there is no standard.

SMACNA's "Round Industrial Duct Construction Standards," second edition, contains a list of flanges that specifies the location of the bolt holes based on the height of the flange and leg of the angle ring. However, since the clearance between the duct OD and the ring ID is not specified, the actual bolt circle is uncertain. Those rings or flanges are assumed to be custom fabricated. ▼

Publication Spotlight

Accepted Industry Practices for Sheet Metal Lagging

The first edition of “Accepted Industry Practices for Sheet Metal Lagging” provides industry professionals with the accepted industrial practices for the application of sheet metal lagging to industrial duct, pipe, tanks, boilers, furnaces and other accessories.

The main purpose of the metallic or plastic covering, known as lagging, is to protect the more fragile insulating material from the effects of weather and traffic in an industrial setting. This publication assists the designer, contractor and plant engineer in understanding and solving the complexities involved in the design, fabrication and installation of sheet metal lagging systems.

The fabrication practices illustrate the requirements of most commonly encountered insulated surfaces, such as boiler walls, flues, ducts, precipitators, air heaters, economizers, tanks, fans and provide numerous examples of sheet metal lagging applications.

SMACNA members have been offered a gratis copy and may purchase additional copies for \$15. Non-members may purchase the manual for \$83. The price for IFUS contributors is \$44 and the discounted price for engineers and architects is \$58. Visit the publications store at www.smacna.org or call (703) 803-2989 to order. ▼

Industrial Contractors to Focus on Specialized Training

Industrial sheet metal training will be the focal point of the Industrial Contractors Forum on Tuesday, Oct. 22 at SMACNA’s annual convention, Oct. 20-23 in Las Vegas.

The session will include an overview of the variety of products, programs and services offered by the International Training Institute (ITI) for the sheet metal industry.

One essential service offered through the ITI is the ITI/American Welding Society (AWS) Certified Welder Program. Since its creation, the program has assisted countless SMACNA Contractors secure work by providing welding certification. A significant portion of the forum will be devoted to the ITI/AWS Certified Welder Program. This will include specific examples of how SMACNA industrial contractors have successfully utilized this program to enhance their business opportunities. In addition, it will provide an opportunity to educate attendees about the new structure of the welding program and how it is more accessible to SMACNA Contractors.

The final portion of this session will focus on the array of safety and health products provided through the Sheet Metal Occupational Health and Safety Institute Trust (SMOHIT) and SMACNA. The emphasis will be on the products and programs especially useful to contractors in the industrial market sector.

The forum will conclude with a roundtable discussion on critical issues facing this market sector led by the Industrial Contractors Council Steering Committee. ▼

Illinois Firm Offers Client Cost-Saving Option

Waste Treatment Vessel, Joliet, Ill.

Sheet Metal Contractor: TAL-MAR Custom Metal Fabricators Crestwood, Ill.

Assisting their client in saving an existing piece of equipment and realizing a substantial cost savings was the primary objective for the team at TAL-MAR Custom Metal Fabricators.

The crew coordinated the refurbishing of a 39,000-lb. waste treatment vessel including its design, engineering, fabrication and installation. In addition, TAL-MAR coordinated all the transportation logistics for the project which included removal and shipping the vessel through three states to the sheet metal shop and returning it to the customer’s facility for final installation.

“We were able to offer the customer a cost savings by refurbishing their item,” explained Mike McGrail, of TAL-MAR. “Rather than spending more for a new item, we achieved the same result.”

The final installation of the unit required a 70-ton crane for placing the vessel through the roof of the facility.



Washington Contractor Helps Client Avoid Plant Shutdown

Iowa Beef Processing, Wallula, Wash.

Sheet Metal Contractor: Randolph Sheet Metal, Pasco, Wash.

After a violent wind storm damaged an existing plant duct line, the Randolph Sheet Metal crew was contracted to replace the duct line and install a make-up air unit.

“This was an emergency project for our client,” explained Lonnie Cook, project manager at Randolph Sheet Metal. “Without this unit and duct, the plant would not receive any fresh air from the outside and would be at a complete shut down.”

“Working around the existing roof penetrations was a unique challenge,” Mr. Cook continued. “Our crew also paid special attention not to interfere with existing equipment.”

Design of the project began with a visit to the site to measure the roof penetrations. Then with the use of 3-D CAD soft-



This 3-D CAD drawing (above) depicts the design and dimensions necessary for the plant project.

ware the design department created the duct system. This drawing was given to the shop staff for fabrication. Using 16 gage Type 304 stainless steel, ducts ranging from 24 inches to 60 inches in diameter and supports were created. Final installation at the site required the use of a 190-ft. crane.

Now complete, the installed ductwork (left) is an exact representation of the CAD drawing.



Revisions to SMACNA's Rectangular Industrial Duct Manual Underway

First published in 1980, SMACNA's "Rectangular Industrial Duct Construction Standards" provides designers of air pollution control and industrial ventilation systems a standardized text to use during the design process. Now, more than 20 years later, a wealth of new technologies has entered the industry and a task force is beginning the process of updating this manual to reflect these new tools.

Scheduled for completion in late 2003, the revision will include new tables for stainless steel and aluminum, new expanded chapters on materials, welding practices and a guide

specification. The publication will also contain several chapters found in the first edition of SMACNA's "Accepted Industry Practice for Industrial Duct Construction."

Another new feature of the revised manual will include the results of a comprehensive research project using physical tests as well as finite element analysis modeling to provide the basis for a more thorough design process, including consideration of the parameters affecting shear collapse and global buckling failures of the duct side walls. ▼

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