



Fabrication Duct Pressure Classes – Advanced Setup & Configuration

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Learning Objectives

At the end of this class, you will be able to:

- Understand the function and need for well-defined pressure classes
- Build pressure classes specific to your company/project needs
- Understand the inner working of pressure classes
- Allocate and report material requirements for duct fabrication

About the Speaker

Originally hired as the programming manager for the MAP (now Autodesk Fabrication) software almost 25 years ago, I have been working with the software worldwide ever since. I spend around 50 weeks a year traveling, training and consulting with new and existing customers, big and small – providing methods and solutions to allow users to get the most out of the software. No two customers are the same or have the same requirements – so I think I can say that I have seen just about everything. Having an in-depth knowledge of both the software and the contracting industry puts me in the best possible position to provide the best possible solutions. Making use of the CAD, CAM and EST modules, along with Remote Entry, Tracker and Scripting – no problem is insurmountable – just takes a little creativity.

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Understand the function and need for well-defined pressure classes

What is a Pressure Class?

Pressure Classes form the heart of the sheet metal/HVAC construction standards of the Autodesk Fabrication software. A well designed set of standards, which are shared through the Estimating, CAD and CAM fabrication modules make the duct produced 'work'. Badly defined standards require 'adjustments' between the EST, CAD and CAM phases with the potential result that what is estimated and drawn is not what is actually shipped out to the job site and installed.

The two primary standards used in the world are provided by SMACNA (eg. ½" to 10" positive and negative standards) and DW/144 (eg. LV, MV and HV).

These published standards define the construction requirements (material thickness, connectivity standards, reinforcing, etc) necessary for fabricating ductwork to withstand the pressure of air it is designed to move.

These construction requirements are just that – requirements. Numerous options are provided to meet the minimum and duct can be over-built. Based on fabrication machinery available, user preferences, etc – there are multiple methods of building duct work that meets or exceeds these standards.

Creating a set of pressure classes for your company can optimize your fabrication (and installation) capabilities, reduce cost, etc.

Pressure classes should be shared amongst the software disciplines. Numerous companies have one set of standards used for estimating but another set for CAD and fabrication. The estimating standards should be the CAD standards which should be the fabrication standards. Using one set of standards allows a direct 'apples for apples' comparison during the life of a project. If the standards are the same, a CAD drawing of an estimated floor or the actual fabricated floor, should give the same material, price and labor.

A pressure class defines the material thickness required, the connector and seam to be used, the reinforcing necessary to build a particular sized duct to meet a specific pressure rating.

Build pressure classes specific to your company/project needs

Every company has a different opinion of what the optimal pressure class standards are. Over the last 25 years of working with customers virtually every week, no two companies can agree on the best way to build duct to meet a particular pressure standard.

The pressure classes published by companies such as SMACNA and B&ES Ductwork Group (DW/144) are guidelines for the minimum requirements. They are ambiguous and open to interpretation. Add to this the actual available fabrication equipment available and user's preferences for building ductwork and the options are endless.

One company might go for the light gauge metal/heavy reinforcement solution where another goes for the heavy gauge metal/minimum reinforcement.

Defining what works best for your company is step one. An often overlooked factor is the labor cost – just because the standard has the least amount of material cost does not mean that it saves labor in the fabrication shop (or factory for non-US attendees) and/or site installation labor.

A company needs to put some resources and research into what standards work best for them. Having a complete set of standards available for use as the estimating, CAD and fabrication stages of a project provides a strong solid base to work from.

Projects themselves can require 'adjustments' to these standards (eg. No 26 gauge, no internal stiffening, etc). If you have a good understanding of your standards, making these changes is easy.

Understand the inner workings of pressure classes

Pressure Classes are simply complicated. Like the bulk of the Fabrication software modules and features, pressure classes are built up from numerous 'simple' things but, put together, can become complicated. Many users have run into problems defining and maintaining pressure classes due to over-complexity and not really understanding the basics.

One of the best things about the Fabrication software suite is that takes a large number of very simple concepts and combines them together into a rather complex but powerful product. The software is VERY customizable but to get the most out of it you need to know what you are trying to achieve and to understand the basic (and simple) building blocks used to get there.

As an example, take a simple square elbow. The elbow may look simple but in fact it is rather complex but the complexity is built around very simple components. The elbow as sheet metal parts (the gauge of which is driven by the pressure class), connectors and seams (driven by the pressure class), potentially vanes and reinforcing (driven by the pressure class) and maybe sealant (driven by the pressure class). The connectors, seams, vanes, etc are built themselves from components (connector corners, bolts, vanes, etc). These components are attached to price, labor and weight information. The end result is that if you take a square elbow and apply a specific pressure class to it you can access a vast amount of information. This information is available via paper reports, labels/stickers and data exports.

Most users have an understanding of the connectors, seams, etc and recognize the component level information available. Stiffeners are exactly the same and if approached from the component level can easily be defined, configured and reported.

A large portion of this class will be dedicated to stiffener definitions, naming strategies and reporting options.

Alternate seams and connectors within pressure classes is a method to specifically designate a certain seam or connector for a particular fitting under particular circumstances. A typical example of this would be the rectangular connector of a square to round. The pressure class you are using may call for S&D type connectors up to a certain size but then TDC/TDF above that size. A common practice is to build square to rounds using a Ductmate connector in place of the TDC/TDF. By setting up an alternate connector in the pressure classes, this can easily be achieved.

Allocate and report material requirements for duct fabrication

Following on from the previous topic with regards to the 'component' nature of all items, the final part of the class will address extracting the information in paper and/or data forms.

Whether you need a sheet detailing the stiffener requirements for the duct being fabricated or a data file for accounting summarizing the actual materials used, the reporting and 'output' capabilities of the Fabrication software are infinitely flexible.

We will be looking at examples of how to build various reports and output formats, best practices and suggestions.