

Wrightsoft's CAD Quality 2 Line Drawings

HVAC system designers have always wanted scaled, plan view drawings of ductwork to make it obvious what the ductwork should look like, and how it should fit into the building. Professional Engineers have used CAD programs to construct drawings of their HVAC designs. Now, designers can skip the tedious drawing part, and instead, use Wrightsoft's new, automatic scaled drawings.

Multiple Drawing Modes

Figure 1 shows a *one-line* presentation of ductwork. In some circumstances, this schematic-quality presentation is just right. In Wrightsoft software, one-line ducts are obtained by pressing Ctrl-1, or by selecting the menu option *Drawing/Duct Drawing Mode/One-Line Ducts*.

The conversion to 2 lines is essentially instantaneous. The designer just presses Ctrl-2, or selects the menu option *Drawing/Duct Drawing Mode/Two-Line Ducts*. Figure 2 shows the same duct section as two-line ductwork.

Each of the fittings in Figure 1 has been automatically redrawn as a top (plan) view of the individual fitting. For example, the two elbows near the top of each figure are not the same elbow. The one-line fittings are shown as elbows, but the two line fittings reveal that the left-most elbow is smooth round type CD3-1, while the right-most elbow is a pleated round type CD3-5. Each of these fittings was selected by the designer via the Fitting Selection Screen, as shown in Figure 3. Wrightsoft has designed matching CAD fittings for each of the 112 fitting types in the ASHRAE fitting database. This means that regardless of which fitting a designer may choose, Wrightsoft programs automatically calculate the airflow and size of each fitting using ASHRAE's duct fitting database, and then Wrightsoft programs automatically look up the fitting drawing, and automatically draw the scaled fitting in the correct orientation.

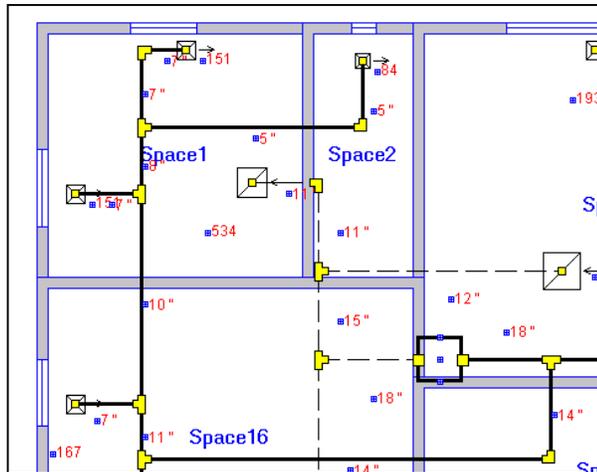


Figure 1 - One-Line Ductwork (press Ctrl-1)

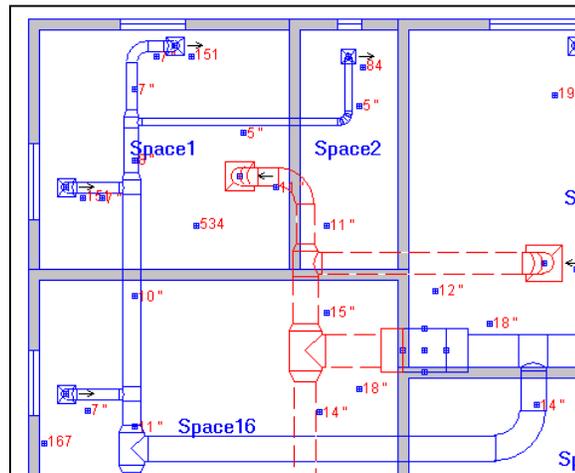


Figure 2 – Two Line CAD Ducts (Ctrl-2)

These same fitting drawings are available to the designer as a Wrightsoft printout, or as a new layer in an external CAD file, such as AutoCad's DWG format or DXF.

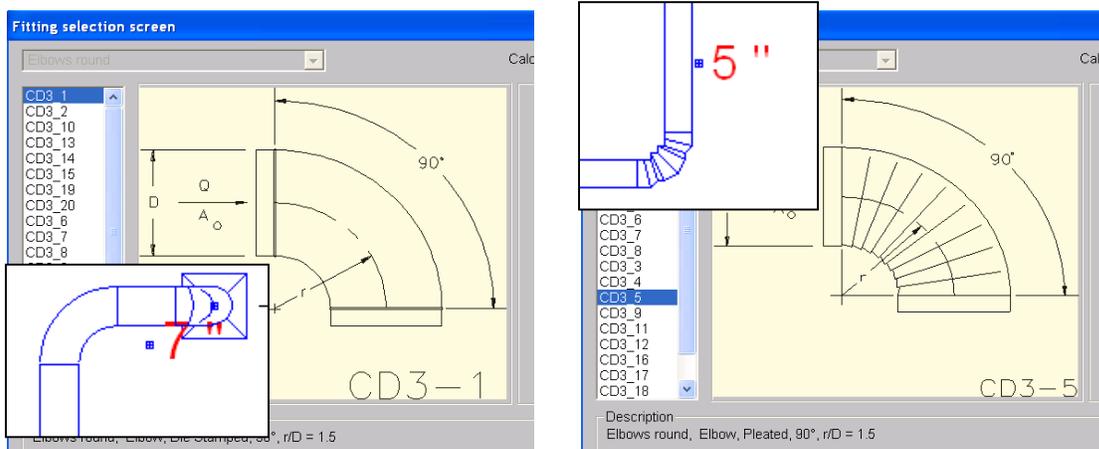


Figure 3: Fitting selector screens and resulting 2-Line CAD drawings

The third duct drawing mode is frequently used to reduce visual clutter by combining two-line CAD drawings for trunks with one-line drawings for branch runs. Figure 4 shows the same ductwork as Figure 1 and Figure 2, but with two-line trunks with one-line branches. To obtain this display, the designer uses Ctrl-3 or selects *Drawing/Duct Drawing Mode/Mixed two-one line ducts*.

There are no other tricks to convert between these three modes, and they are all essentially instantaneous.

There are, however, several tips that designers will appreciate for specific drawing details:

1. Changing the color of ducts
2. Changing register sizes
3. Changing duct fittings
4. Specifying offsets in rectangular ductwork

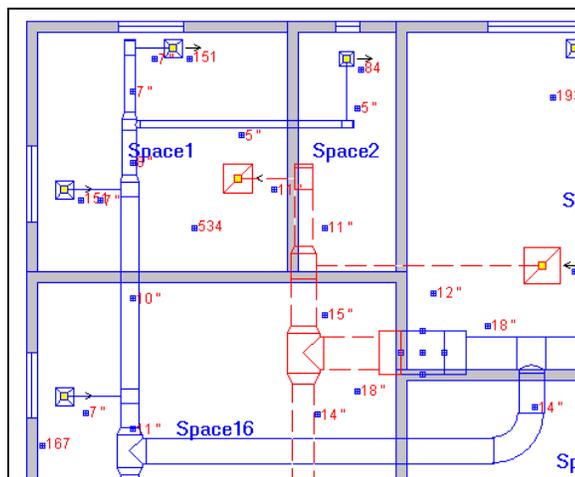


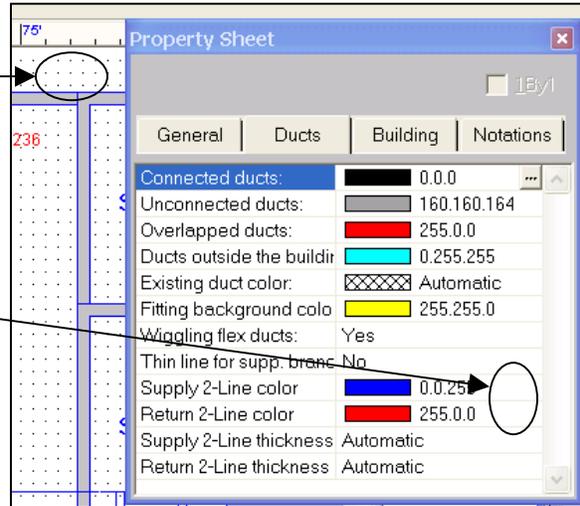
Figure 4: 2-Line with 1-Line Branches

These topics follow as Question and Answers.

How Do You Change the Color of Ducts?

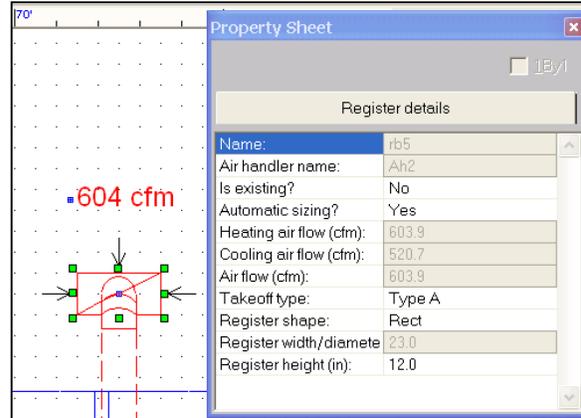
First, bring up the general Property Sheet for the drawing by right-clicking in the area between the ruler and drawing, or by right-clicking outside other objects.

Next, notice that you can change 2-line colors for Supply and Return ducts, by clicking on the right side of the color selector line. You will see a pull down color chart which allows you to select colors for supply and return, but will only apply in 2-line drawing mode. Note also that you can change the thickness of the drawing line to be medium, thick or thin.



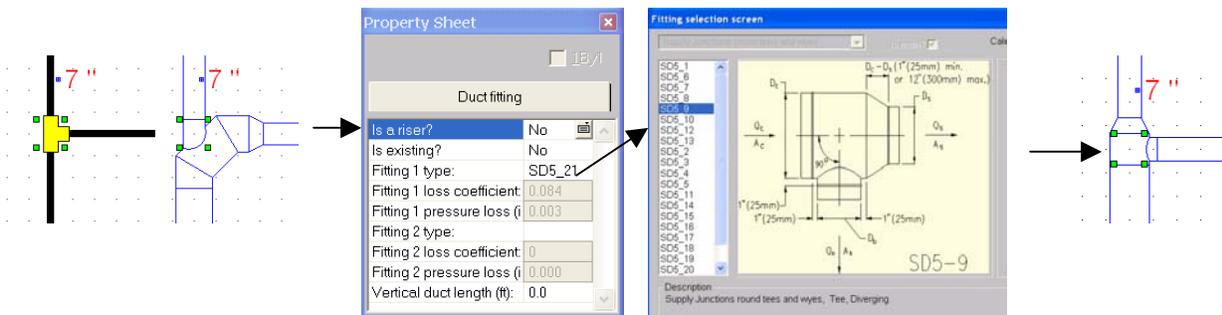
How Do You Change Register Sizes?

First, right-click on the register you want to resize and right-click to view the property sheet. You can change the shape, and/or size by entering new values in the Property sheet.



How Do You Change Duct Fittings?

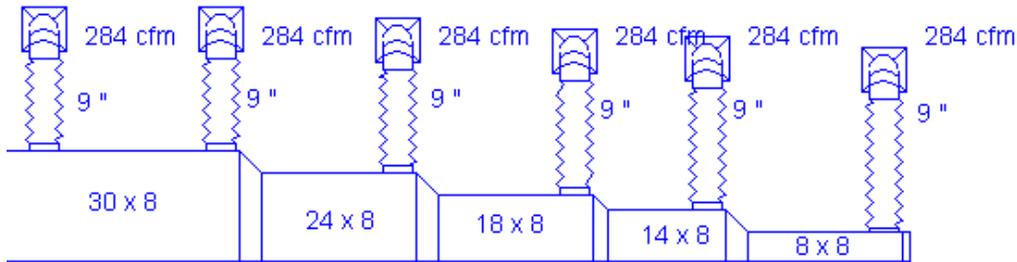
In either 1 line or 2-line duct drawing mode, select the fitting you would like to change by clicking on it. In one-line mode, this is really easy. As you can see from the Figure below, the green handles are right on top of the fitting, and make it really obvious.



Note that the selection box for 2 line fittings may not be in the most obvious place.

How Do You Specify Offsets in 2 Line Ducts?

Rectangular trunk runs frequently reduce size as branch runs take off from the trunk. The reduction from one trunk to the next can be offset to either side, or tapered on both sides. In general, designers keep the trunk height constant, and reduce trunk width as cfm decreases in the trunk. For example, in the Figure below,



The offset is to the right; that is, the child (downstream) trunk has its right side aligned with the parent (upstream) trunk. In the next Figure, the same trunk is aligned to the right for the 24x8 and 18x8 sections, and to the right for the 14x8 and 8x8 sections. Wrightsoft's Property Sheets allow each trunk duct to be aligned to the upstream trunk section either to the left, the right, or the center.

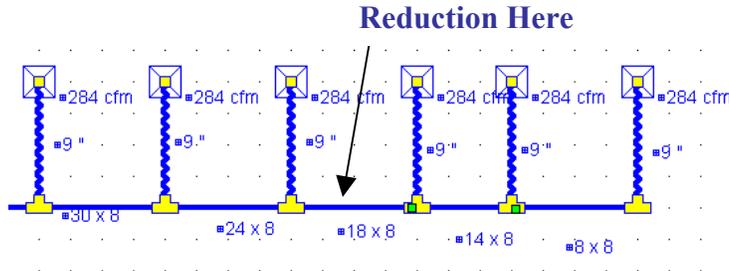
The diagram shows the same duct system as above, but with two Property Sheet windows open. The left window is for duct 'st7' and the right window is for duct 'st8'. Arrows point from the 'Rect parent/child align' property in each window to the corresponding duct section in the diagram.

Property Sheet (st7)	
Duct name:	st7
Sheet:	Sheet 1
Air handler name:	Ah1
Is existing?:	No
Automatic sizing?:	Yes
Heating air flow (cfm):	852.7
Cooling air flow (cfm):	852.7
Design air flow (cfm):	852.7
Design mode:	Cooling
Duct shape:	Rect
Pressure loss adjustem:	0.000
Rect parent/child align:	Right
Size as parent trunk:	No
Duct diameter (in):	13.5
Duct material:	Sheet metal
Rectangular duct width (in):	18.0
Rectangular duct height:	8.0
Velocity (fpm):	853
Duct length (ft):	4.0

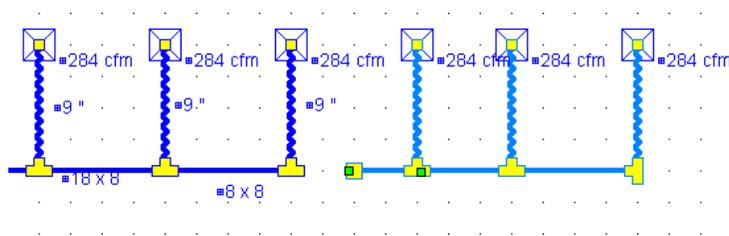
Property Sheet (st8)	
Duct name:	st8
Sheet:	Sheet 1
Air handler name:	Ah1
Is existing?:	No
Automatic sizing?:	Yes
Heating air flow (cfm):	568.5
Cooling air flow (cfm):	568.5
Design air flow (cfm):	568.5
Design mode:	Heating
Duct shape:	Rect
Pressure loss adjustem:	0.000
Rect parent/child align:	Left
Size as parent trunk:	No
Duct diameter (in):	11.9
Duct material:	Sheet metal
Rectangular duct width (in):	14.0
Rectangular duct height:	8.0
Velocity (fpm):	731
Duct length (ft):	3.0

How Do You Insert a Reduction into a Trunk?

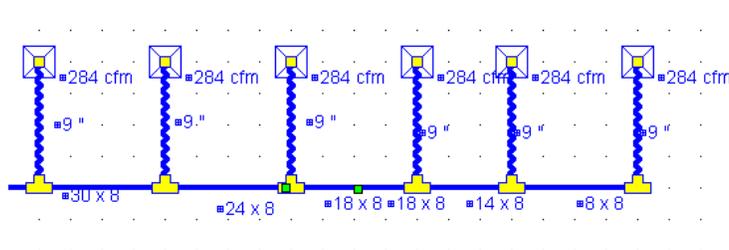
The preceding two Figures showed trunk reductions immediately after the takeoffs. If you would like to place takeoffs further upstream from the reduction, then you need to move the reduction downstream. To do this, it may be easier to switch to one-line mode, although it will work fine in two-line mode. Suppose that you would like to move the 24x8 reduction downstream, to be further from the takeoff. In essence, you would like to extend the 24x8 trunk to the right about one foot.



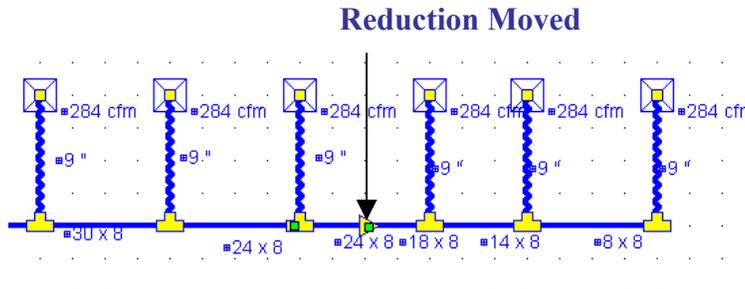
First, pull the 18 x 8 duct to the right, from the down-stream end of the fitting, creating an opening in the trunk.



Next, insert a new duct segment in the space you have created



Next, right click the new duct and set the Property *Size as Parent Trunk* to yes, which forces the new short segment to have the same size as the 24x8. This setting is the key to inserting the new reduction.



Property Sheet

1By1

Duct details

Duct name:	st7
Sheet:	Sheet 1
Air handler name:	Ah1
Is existing?:	No
Automatic sizing?:	Yes
Heating air flow (cfm):	852.7
Cooling air flow (cfm):	852.7
Design air flow (cfm):	852.7
Design mode:	Cooling
Duct shape:	Rect
Pressure loss adjustem:	0.000
Rect parent/child align:	Automatic
Size as parent trunk:	Yes
Duct diameter (in):	15.6
Duct material:	Sheet metal
Rectangular duct width:	24.0
Rectangular duct height:	8.0
Velocity (fpm):	640
Duct length (ft):	2.0

To see the resulting 2 line drawing, with the reduction in place, simply press Ctrl-2.

