

eDucts 1.0 Ductwork and Fittings

by CCAD inc.

The eDucts program is a cost-effective add-on for AutoCAD 2000 and later developed to simplify the design process of lying round ductwork. The program increases design efficiency, accuracy, and consistency by following some typical duct construction rules.



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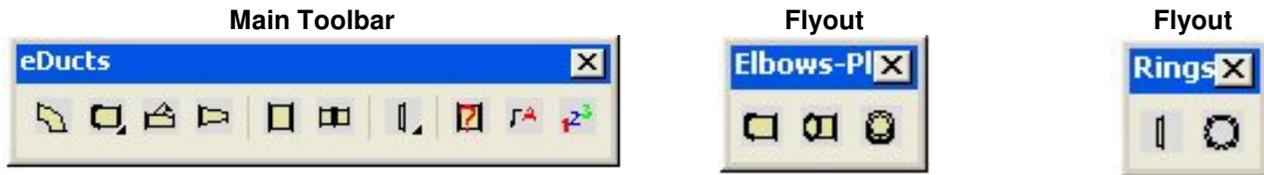
Demo Version

The Demo Version of eDucts is full functioning except the sizes are limited.

See <http://www.ccadinc.com/addons.html#faq> for the latest in Frequently Asked Questions about CCAD inc. Add ons for AutoCAD.

Toolbar and Commands

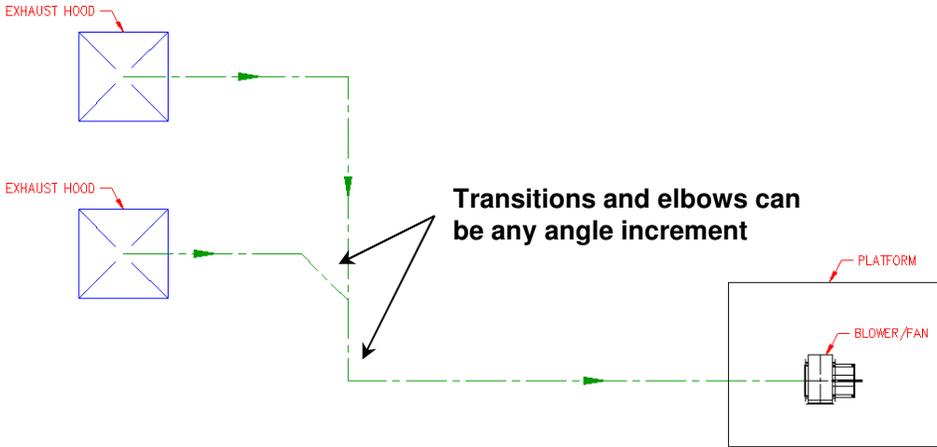
First let's go over the different Commands/Buttons on the eDucts toolbar.



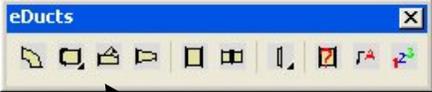
-  **Elbow:** Used to create elbows of specified diameter and angle of bend. Also gives the option to show angle ring holes.
-  **Elbow – Plan Top:** Used to generate the top view of elbow of a specified diameter and angle of bend.
-  **Elbow – Plan Bottom:** Used to generate the bottom view of elbow of a specified diameter and angle of bend.
-  **Elbow – Plan End:** Used to generate the end view of elbow of a specified diameter and angle of bend.
-  **Transition:** Used to generate a “wye” transition of a specified length and diameters. Also gives the option to show angle ring holes.
-  **Concentric Reducer:** Used to generate a concentric reducer of a specified length and diameters. Also gives the option to show angle ring holes.
-  **DrawDuct:** Used to create a straight run of duct of a specified diameter and length. Gives option of showing the angle ring flanges. Also gives the option to show angle ring holes.
-  **Duct Run and Angle Rings:** Used to create a straight run of multiple ducts of a specified diameter with angle ring flanges. Given the diameter, overall length, and maximum length of 1 run of duct; the command calculates the number of ducts and the required length of the last duct to create. Also gives the option to show angle ring holes.
-  **Single Angle Ring Elevation:** Used to generate elevation view of angle ring of a specified diameter. Also gives the option to show angle ring holes.
-  **Single Angle Ring Plan:** Used to generate plan view of angle ring of a specified diameter. Also gives the option to show angle ring holes.
-  **Duct List:** Lists diameter and other properties of selected duct.
-  **Add Duct Leader:** Adds a leader describing the duct (i.e. diameter, elbow, transition).
-  **Create Duct List:** Creates a Bill of Materials and assigns a designation to each duct.

Adding Fittings

The most efficient way to use eDucts is to draw a single line path for the ductwork to follow. When drawing the single line path, be aware that the elbow and "wye" transitions can be created at any angle increment. An example is shown below. We are going to run 12" diameter duct from the 2 exhaust hoods, transition into one 18" diameter duct, and continue to the blower on a raised platform.

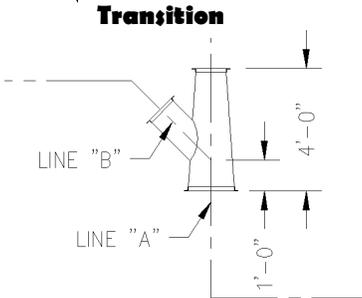


The next step would be to place the "wye" transition where the two ducts merge into one duct. To do this, select **Transition** from the eDucts toolbar.



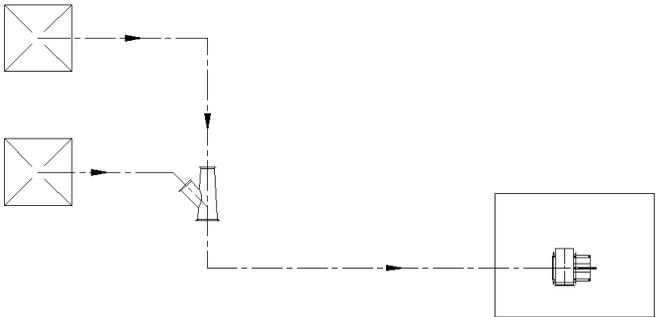
The program will then prompt the following questions at the command line:

<i>Center line of main duct at end near transition:</i>	Pick line "A"
<i>Center line of intersecting duct:</i>	Pick line "B"
<i>Distance from transition to start of main duct <12>:</i>	12
<i>Length of transition <4'>:</i>	4'
<i>Main duct diameter near transition:</i>	18
<i>Main duct diameter away from transition:</i>	12
<i>Intersecting duct diameter:</i>	12
<i>Include angle ring holes [Yes/No]: <No>:</i>	No



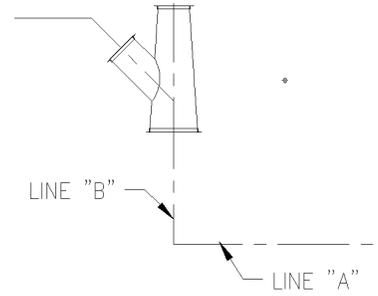
Now that we have our transition in place, we are going to add our elbow ducts. An elbow is a piece of duct that changes direction at specific angle. For this step, we have three elbows to place; an 18" Dia. x 90°, a 12" Dia. x 90°, and a 12" Dia. x 45°. First, let's place the 18" dia. x 90° elbow.

Select **Elbow** from the eDucts toolbar.

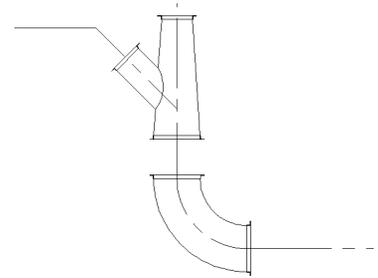


The program will then prompt the following questions at the command line:

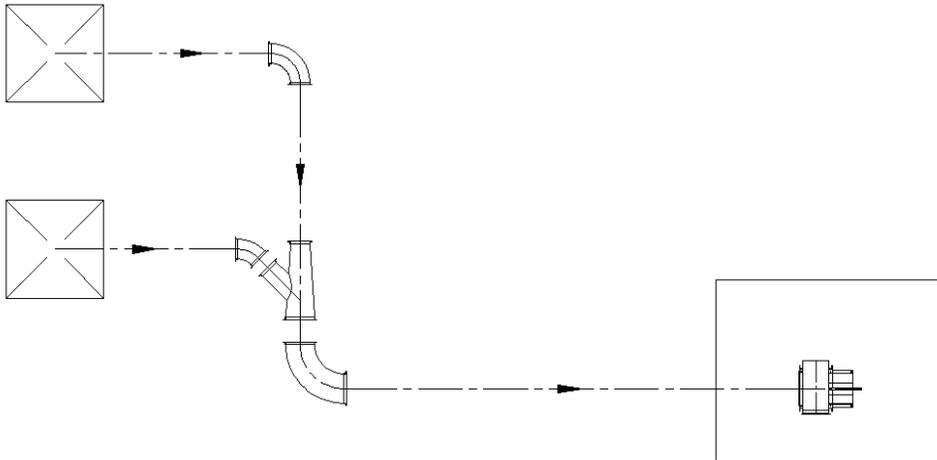
<i>Duct Diameter <8"></i> :	18
<i>Duct radius factor (Ex. 2.0) <1.50></i> :	1.5
<i>Include angle ring holes [Yes/No]: <No></i> :	No
<i>Center line of duct:</i>	Pick line "A"
<i>Center line of next duct:</i>	Pick line "B"



Next the program calculates the angle between the two an 18" Dia. elbow at the intersection. The radius of the bend can be changed in the second prompt of this command. The radius of the bend is 1.5X the diameter of the elbow. In this case, the radius would be 27" since the diameter was 18". Note that one of the options of the command is to include the angle ring holes. If yes was selected, centerlines would have been added to represent the locations of the bolts holes on the angle ring.



Using the same command we can add the other two elbows, which will get us to the stage shown below.



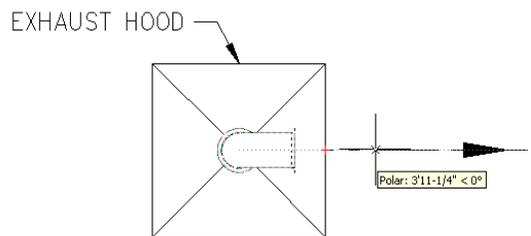
The next step is to show the elbows that turn 90° down at the center of each hood. Since the insertion point of the duct is at the end and not the center of the bend down, we are going to create the elbows and move them into position afterwards. Select **Elbow Plan - Top** from the CCAD duct toolbar.



Elbow Plan - Top

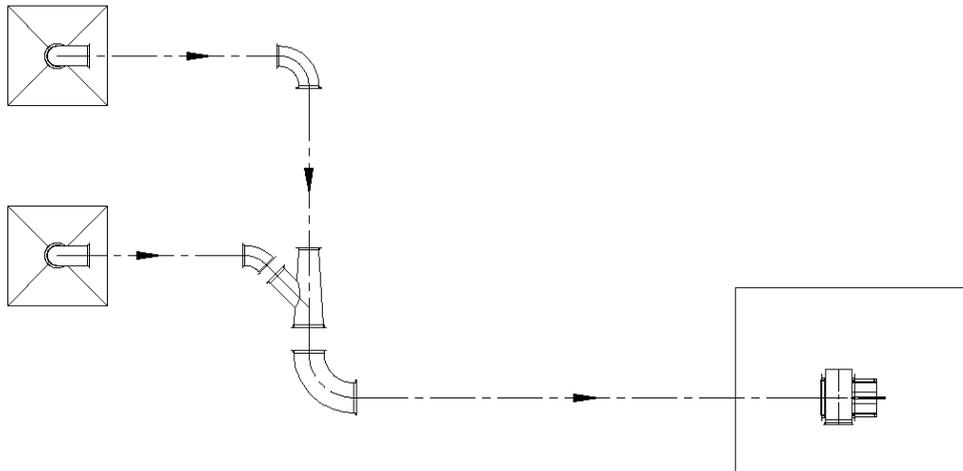
The program will then prompt the following questions at the command line:

<i>Duct diameter <10"></i> :	12
<i>Duct radius factor (Ex. 2.0) <1.50></i> :	1.5
<i>Elbow angle <90></i> :	90
<i>Locate by [End/Plan] <End></i> :	Plan
<i>Center point of angle ring:</i>	Pick a point & choose a rotation angle



Once created, we can now move the duct from the center of the bend down to the center of the exhaust hood.

Using the same techniques as above we can add the other 12" dia. elbow at the other hood, which will get us to the stage shown below.



Adding Ductwork

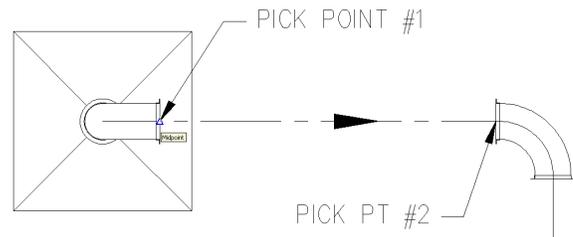
Now comes the easy part. You can now fill in between all of the already placed ducts with straight runs. To do this, select **DrawDuct** from the CCAD Ducts toolbar. Enter the diameter, whether you want to show the angle ring holes, & the start and end points; which determines the length. An exact length may be entered instead of an end point.



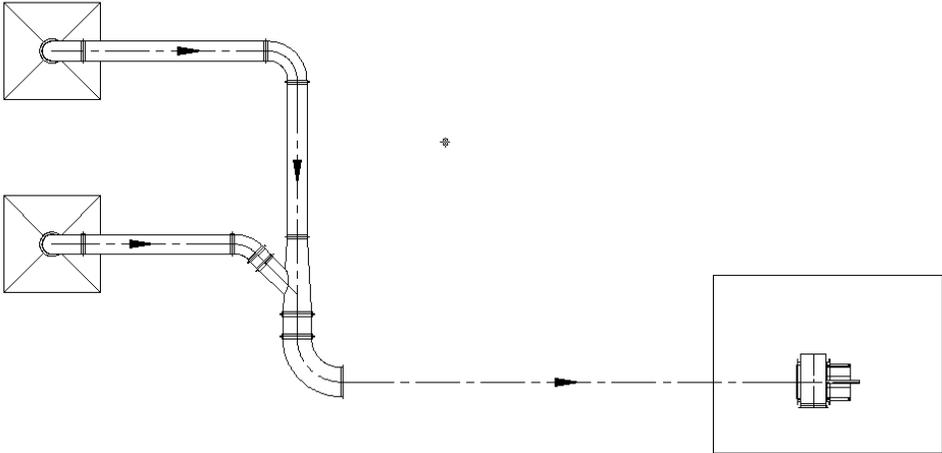
DrawDuct

The program will then prompt the following questions at the command line:

<i>Duct diameter <'0"></i>	12
<i>Start point of duct:</i>	Pick Point #1
<i>End point of duct:</i>	Pick Point #2
<i>Draw angle rings [Yes/No] <Yes></i>	Yes
<i>Include angle ring holes [Yes/No]: <No></i>	No



Using the same techniques as above we can add the other runs up to the 18" dia. x 90° elbow, which will bring us to the stage shown below.



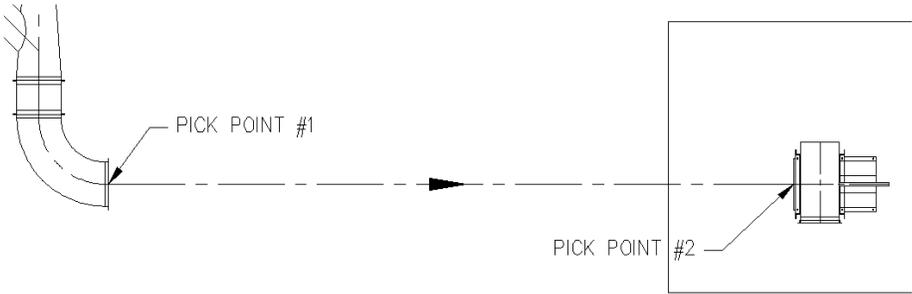
The Distance between the 18" dia. x 90° elbow and the blower is 23'-4". Instead of using one section of duct that is 23'-4" long, it would more likely be made up of multiple sections of shorter lengths. To demonstrate the **Duct Run and Angle Rings** command, let's say that the maximum length that a duct can be made is 10'-0". Select **Duct Run and Angle Rings** from the CCAD Ducts toolbar.



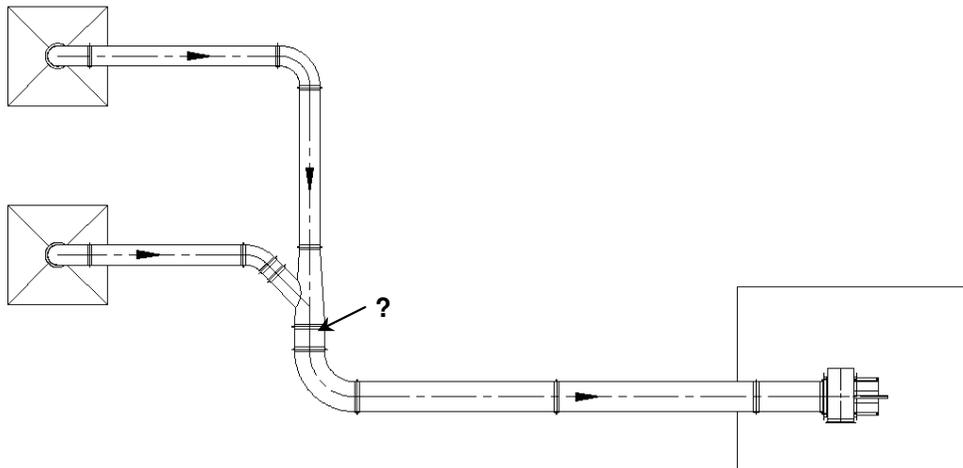
Duct Run and Angle Rings

The program will then prompt the following questions at the command line:

Duct diameter <16">: **18**
Include angle ring holes [Yes/No]: <No>: **N**
Duct length <10'0">: **10'**
Start of duct run: **Pick Point #1**
End of duct run: **Pick Point #2**



Notice that the command automatically placed (2) 10' sections and (1) 3'-4" section of duct between the two points. Now that all of the ducts have been placed, you can trim any lines as needed. The final sample should look like that below.



Listing Components

If you wanted to know the properties of the small duct between the 18" dia. 90° elbow and the 'Y' transition, you can use the **Duct List** command. Select **Duct List** from the CCAD Ducts toolbar and pick on an edge of the duct.



The command line will list the following properties:

Item is 18" DIA. DUCT. Length is 1'-3/4"

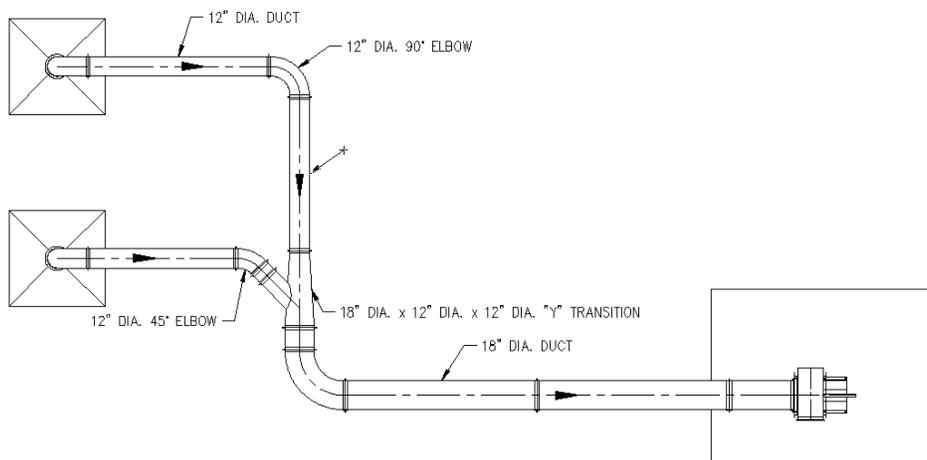
The CAD drawing's units determine the precision that is listed. If an elbow and a "Y" transition were selected, they would look similar to the following:

Item is 12" DIA. 45%%d ELBOW. RADIUS is 1'6"

Item is 18" DIA. x 12" DIA. x 12" DIA. "Y" TRANSITION. Length is 4'0"

Annotating Components

The **Add Duct Leader** command works similar to AutoCAD's leader command except that it automatically calls out the duct description of the selected duct. This command creates the leader using the current dimension style (i.e. text height, arrow size, dimscale...). An example is shown below.



You can also use the **Create Duct List** command, which creates a bill of materials and assigns a designation to each duct. To use this command, select **Create Duct List** from the CCAD Duct toolbar. **Note:** This command can only be used in a layout and not the model space tab.

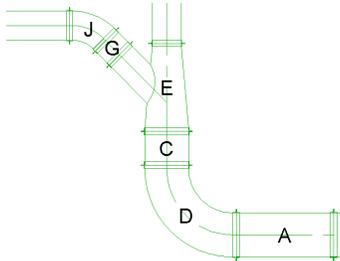


Create Duct List

The command line will ask you to *Select schedule block:* Select the attributed block that comes with this program. The schedule block is the one that has the empty fields. Remember that the material schedule must be on a sheet layout and not in model space.

BILL OF MATERIAL (DUCTWORK)				
ITEM	QTY	DESCRIPTION	LENGTH/RADIUS	STATUS

Once you select the schedule block, the program automatically fills out the bill of material and assigns each duct with the appropriate item call. Below is what the finished command will look like. Notice that it counts identical items such as item B. There were (2) 18" dia. x 10'-0" long sections.



BILL OF MATERIAL (DUCTWORK)				
ITEM	QTY	DESCRIPTION	LENGTH/RADIUS	STATUS
A	1	18" DIA. DUCT	39"	New
B	2	18" DIA. DUCT	100"	New
C	1	18" DIA. DUCT	1'-34"	New
D	1	18" DIA. 90° ELBOW	2" RADIUS	New
E	1	18" DIA. x 12" DIA. x 12" DIA. "Y" TRANSITION	30"	New
F	1	12" DIA. DUCT	90"	New
G	1	12" DIA. DUCT	8-1.8"	New
H	1	12" DIA. DUCT	78-3.8"	New
I	1	12" DIA. DUCT	96-1.8"	New
J	1	12" DIA. 45° ELBOW	18" RADIUS	New
K	1	12" DIA. 90° ELBOW	18" RADIUS	New

EQUIPMENT LAYOUT PLAN