



Task Title: Duct Installation Calculations

OALCF Cover Sheet – Practitioner Copy

Learner Name: _____

Date Started: _____

Date Completed: _____

Successful Completion: Yes No

Goal Path: Employment Apprenticeship

Secondary School Post Secondary Independence

Task Description: The learner will use a formula to perform calculations related to ductwork installation.

Main Competency/Task Group/Level Indicator:

- Understand and Use Numbers/Use measures/C3.2

Materials Required:

- Pen/pencil and paper and/or digital device
- Calculator or digital device with calculator function

Learner Information

Sheet metal workers may install ductwork in buildings. They calculate the appropriate duct size and shape based on the required airflow and air velocity.

Read "Relationship Between Volume Flow Rate (V), Cross Sectional Area (A), and Average Air Velocity (v) in a Duct System".

Relationship Between Volume Flow Rate (V), Cross Sectional Area (A), and Average Air Velocity (v) in a Duct System

$$V = A \times v$$

V (Volume Flow Rate) is the amount of air moving through the ductwork per unit of time. This is typically measured in cubic feet per minute (CFM).

A (Cross-Sectional Area) is the area of the duct's opening, calculated based on the duct's dimensions. Diameter is measured for round ducts; width and height are measured for rectangular ducts.

v (Average Air Velocity) is the speed at which the air is moving within a duct. This is typically measured in feet per minute (FPM).

Work Sheet

Task 1: Calculate V (Volume Flow Rate) if A (Cross-Sectional Area) is 2 ft² and v (Average Air Velocity) is 12,000 FPM.

Answer:

Task 2: Calculate A (Cross-Sectional Area) if V (Volume Flow Rate) is 11,000 cubic feet per minute and v (Average Air Velocity) is 4,500 FPM.

Answer:

Task 3: Calculate v (Average Air Velocity) if V (Volume Flow Rate) is 52,000 cubic feet per minute and A (Cross-Sectional Area) is 5 ft²

Answer:

Answers

Task 1: Calculate V (Volume Flow Rate) if A (Cross-Sectional Area) is 2 ft² and v (Average Air Velocity) is 12,000 FPM.

Answer: $V = A \times v$

$$V = 2 \times 12,000 = 24,000 \text{ cubic feet per minute}$$

Task 2: Calculate A (Cross-Sectional Area) if V (Volume Flow Rate) is 11,000 cubic feet per minute and v (Average Air Velocity) is 4,500 FPM.

Answer: $V = A \times v$

$$11,000 = A \times 4,500$$

$$A = 2.44 \text{ ft}^2$$

Task 3: Calculate v (Average Air Velocity) if V (Volume Flow Rate) is 52,000 cubic feet per minute and A (Cross-Sectional Area) is 5 ft²

Answer: $V = A \times v$

$$52,000 = 5 \times v$$

$$v = 10,400 \text{ FPM}$$

Performance Descriptors

| Levels | Performance Descriptors | Needs Work | Completes task with support from practitioner | Completes task independently |
|--------|--|------------|---|------------------------------|
| C3.2 | calculates using numbers expressed as whole numbers, fractions, decimals, percentages and integers | | | |
| | interprets and represents area and volume using symbols and abbreviations (e.g. m ³) | | | |
| | interprets and applies rates (e.g. km/hr) and ratios (e.g. map scales) | | | |
| | chooses and performs required operation(s); may make inferences to identify required operation(s) | | | |
| | selects appropriate steps to solutions | | | |
| | interprets, represents and converts measures using whole numbers, decimals, percentages, ratios and simple, common fractions (e.g. $\frac{1}{2}$, $\frac{1}{4}$) | | | |
| | uses strategies to check accuracy (e.g. estimating, using a calculator, repeating a calculation, using the reverse operation) | | | |

This task: Was successfully completed Needs to be tried again

Task Title: DuctInstallationCalculations_EA_C3.2

Learner Comments:

Instructor (print):

Learner (print):
