## Trade of Sheet Metalwork

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## Document Release History

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<tr>
<td>21/11/06</td>
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Module 4 – General Sheet Metalwork

Unit 12 – Square Reducer

Duration – 7 Hours

Learning Outcome:

By the end of this unit each apprentice will be able to:

- Read and interpret drawings involving square reducer
- Organise the production sequence
- Construct and fabricate a square reducer
- Measure, cut, assemble and fit propriety flange

Key Learning Points:

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<td>D</td>
<td>Drawing and development of a square to square reducer.</td>
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Training Resources:

- Toolkit
- Bench stakes
- Safety equipment and protective clothing
- Notepad
- 0.6mm galvanised mild steel
- Job card
- Tools and machinery/equipment

Key Learning Points Code:

M = Maths  D = Drawing  RK = Related Knowledge  Sc = Science  P = Personal Skills  Sk = Skill  H = Hazards
Figure 1 - Square to Square Transition
Square Reducer

1. Triangulation is used to develop the pattern. Since the four sides are equal developing one side shall be enough.


3. The lengths A Z B and 1 Z¹ 2 are all true lengths and taken directly from the plan.

4. The distance Z - Z¹ is the same as X - X and so we deduce that the sloping side marked R in the elevation is the true length of all 4 sides needed for developing the pattern. Hence Z¹ - Z in the pattern is the same length as R in the elevation.

5. When pattern is developed we put on both ends straight pieces approximately 30mm to facilitate flanges.

6. Making the reducer in 4 parts creates 4 joints at the corners. This has to be considered with time spent closing joints, more effective use of material or marking out a full pattern where we have only one joint.
A straight run of duct may be interrupted periodically by a reducer or transition piece. Some pieces like the one in the drawing on the previous page reduce the cross-sectional area. It goes from 300 x 300 to 200 x 200. This is done to maintain the velocity of the airflow. The further we get away from the air-handling unit the more the air pressure drops. A good system is designed to maintain the original pressure as long as possible.

Technically speaking a reducer reduces the cross-sectional area whereas a transition piece changes the dimensions while still keeping the same area. An example is 400 x 400 changing to 200 x 800 will still give us 160,000 of an area.

The measurements/angles of a transition piece are designed so as to allow air-flow to go through without any obstruction. It is important to stick to the enquiries requirements when fabricating a piece.
Self Assessment

Questions on Background Notes – Module 4.Unit 12

1. What are the cross-sectional areas of the two ends of the transition/reducer piece you just made?

2. What is the area of one side of the transition?
Answers to Questions 1-2. Module 4.Unit 3

1.

\[
\begin{align*}
300 \times 300 &= 90,000 \text{mm}^2 \\
200 \times 200 &= 40,000 \text{mm}^2
\end{align*}
\]

2.

![Figure 5](image)

The vertical height of the job is 250 but the true length is longer. It is established by the triangulation i.e. 50mm against the 250mm. 255 is the true length of the job.

A. \[300 \times 255 = 76,500 \text{mm}^2\]

B. Area of scrap \[50 \times 255 = 12,750\]

Subtract B from A \[76,500 - 12,750 = 63,750\]
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