Trade of Sheet Metalwork	
Module 5:	**Ductwork**
Unit 4:	**Reducer (Flat on Bottom) with Slip Joints**
	Phase 2

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Document Release History

Date	Version	Comments
15/01/07	First draft	
09/04/14	2.0	SOLAS transfer

Module 5 – Ductwork

Unit 4 – Reducer (Flat on Bottom) with Slip Joints

Duration – 3.5 Hours

Learning Outcome:

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

- Sketch a reducer (flat on bottom)
- Mark out and fabricate reducer (flat on bottom)
- Plan job sequence

Key Learning Points:

Rk	Cross joints - slip.
Sk D	Marking out/notching procedure.
Sk	Fabrication and assembly techniques.
Sc	Pressure/ductwork design.
M	Wrapper sizes. Measure area/weight of metal in reducer.
Sc	Pressure/ductwork design.

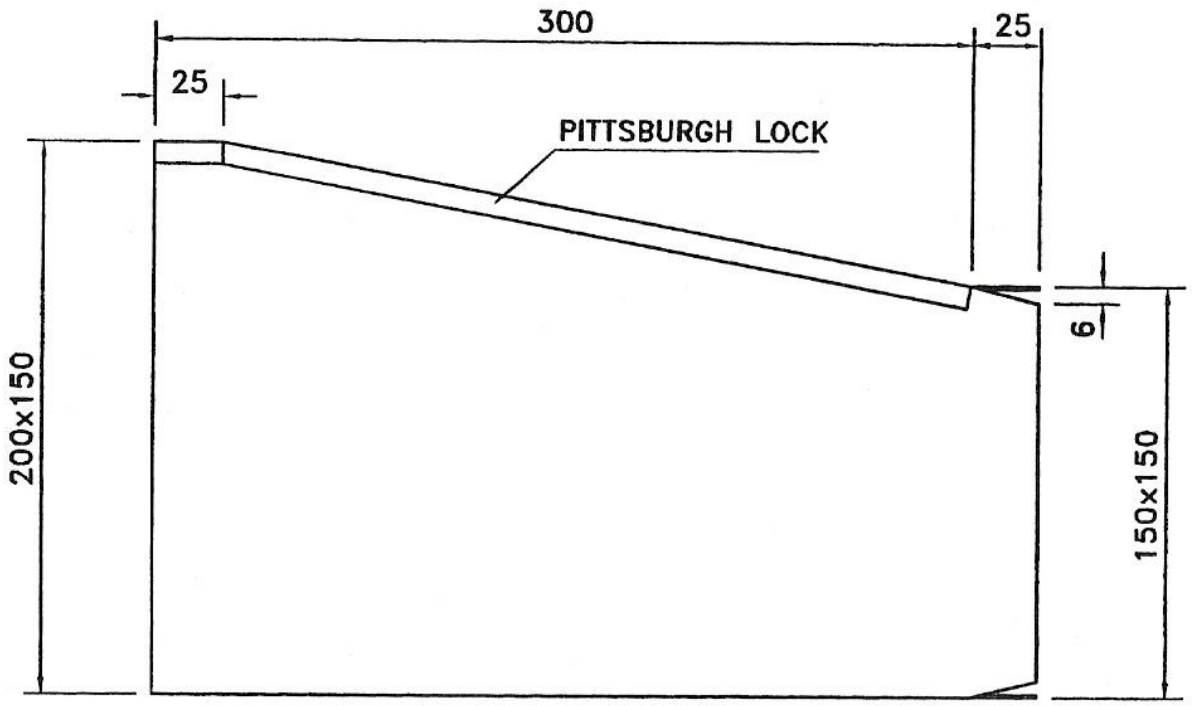
Training Resources:

- Toolkit
- Tools and machinery/equipment
- 0.6mm galvanised mild steel
- Live example
- DW/143, DW/144, DW/TM2, TR-17, DW-171, BS 5970:2001
- Refer to reference library
- Calculator
- Workshop Drawing
- Safety equipment and protective clothing

Key Learning Points Code:

M = Maths D= Drawing RK = Related Knowledge Sc = Science

P = Personal Skills Sk = Skill H = Hazards



NOTE:
THIS FITTING IS DESIGNED FOR USE WITH SLIP JOINTS

Figure 1 - Duct Transition - 2 Piece

The reducer is fabricated to suit a flange at the large end and a slip joint at the small end. The slip joint is notched as shown in Figure 2. The piece manufactured will slip inside the next piece attached to the end 150 x 150. The airflow direction must be considered when using slip joints. If the assembly does not correspond to the flow there may be unacceptable leakage and reduced efficiency of the airflow.

A slip joint, though requiring more labour than a flange, may cost less than flanging as the cost of the flange is obviously removed.

Area/Weight of Metal

The area of metal is got by laying out the pattern for the 3 sides and multiplying the length by the width. If we do not wish to include the scrap we work out the area of scrap. The scrap on either side when joined together makes a rectangle of 300 x 50. Subtract this from the total of 550 (length) x 325 (width).

For a precision calculation include the areas 25 x 50.

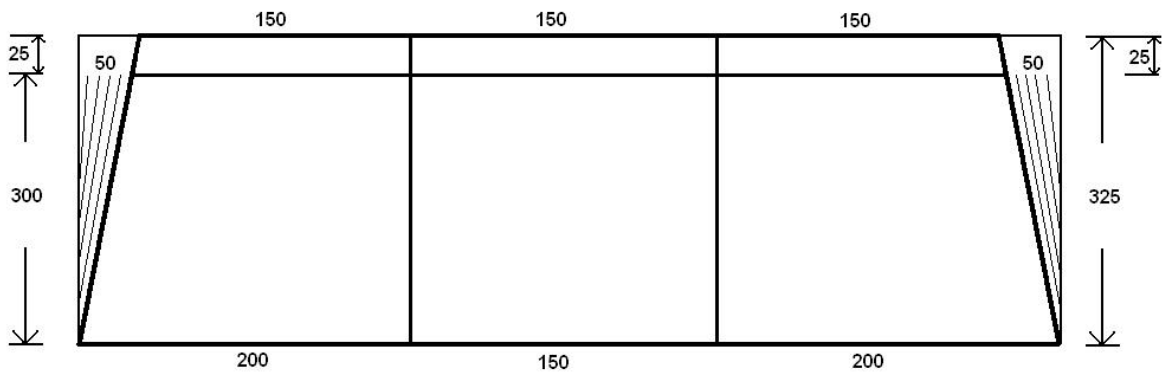


Figure 2 – Area

200 + 150 + 200 = 550mm (length)

325mm = width

550 x 325 = 178,750mm² = Total area

Scrap area:

300 x 50 = 15,000mm²

25 x 50 x 2 = 2,500mm²

Area of scrap = 17,500mm²

Total area – Area of scrap

= 178,750 – 17,500

= 161,250mm²

Pressure/Ductwork Design

There are 3 types of system: low; medium; and high. Testing is done on medium and high systems. For a test to be successful all joints should be sealed as per DW/143. For further information read *HVCA, A Practical Guide to Ductwork Leakage Testing* by *HVCA DW/143.*

Ducting is used to supply and remove air. It is important when designing a system to avoid bottlenecks, turbulence or anything which disturbs the airflow dramatically. Adhering to the initial plans drawn up is best. This may not always be practical as other mechanical services may get in the way. The sheetmetal worker may have to change a plan to allow for pipes such as water or electrical etc. He should be familiar with the manual DW/144 and other specifications involved with the job to avoid creating a future problem.

It is important each team of sheetmetal site workers and shop workers have access to a copy of the manual DW/144 and other related publications.

Self Assessment

Questions on Background Notes – Module 5.Unit 4

1. Work out the amount of metal needed to make a reducer similar to the diagram below. The cross joint sizes being 250 x 200 at the large end and 200 x 200 at the small end.

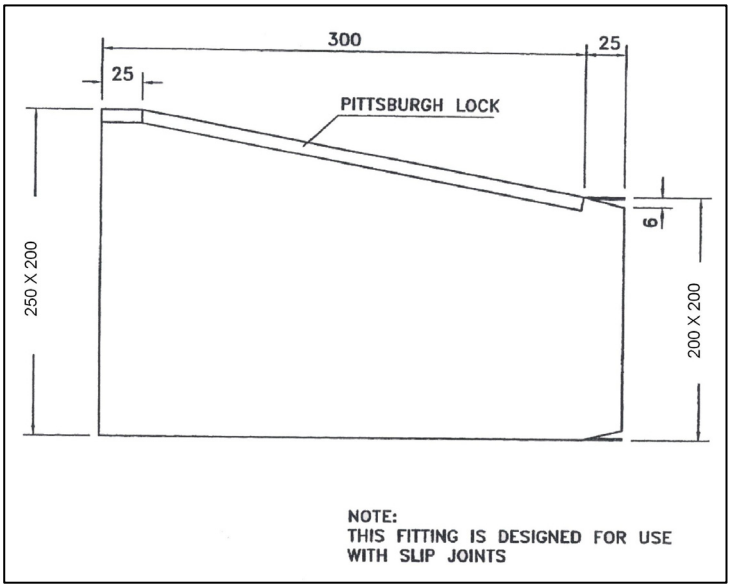


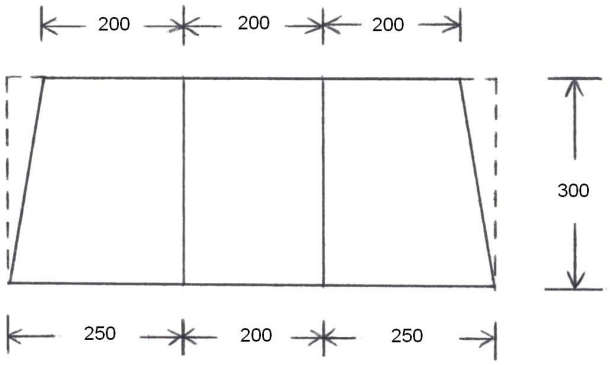
Figure 3

2. Calculate the amount of scrap involved and express it as a fraction or percentage.

Answers to Questions 1-2. Module 5.Unit 4

1.

Figure 4.



Add 250 + 200 + 250 = 700mm

700 x 300 = Area

= 210,000mm²

Add the size of the top part i.e.

200 x 300 = 60,000 + 210,000

= 270,000 mm²

2.

The amount of scrap is 300 x 50 = 15,000mm² x 2 = 30,000

250,000 = 100%

$$\frac{250,00}{100} = 1\%$$

2,500 = 1%

30,000 ÷ 2,500 = 12

= 12%

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