<table>
<thead>
<tr>
<th>Trade of Sheet Metalwork</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 4:</td>
</tr>
<tr>
<td>Unit 8:</td>
</tr>
<tr>
<td>Phase 2</td>
</tr>
</tbody>
</table>
# Table of Contents

List of Figures ........................................................................................................................................ 4

List of Tables ......................................................................................................................................... 5

Document Release History .................................................................................................................. 6

Module 4 – General Sheet Metalwork ................................................................................................. 7

Unit 8 – Common Central Sphere ....................................................................................................... 7
  Learning Outcome: .................................................................................................................................. 7
  Key Learning Points: ............................................................................................................................ 7
  Training Resources: .............................................................................................................................. 7
  Key Learning Points Code: .................................................................................................................. 7

Common Central Sphere ....................................................................................................................... 8

Self Assessment ..................................................................................................................................... 9

Answers to Questions 1-3. Module 4.Unit 8 .................................................................................... 10

Index .................................................................................................................................................... 11
List of Figures

Figure 1 - Common Central Sphere .................................................................................... 8
# List of Tables
## Document Release History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/11/06</td>
<td>First draft</td>
<td></td>
</tr>
<tr>
<td>08/04/14</td>
<td>2.0</td>
<td>SOLAS transfer</td>
</tr>
</tbody>
</table>
Module 4 – General Sheet Metalwork

Unit 8 – Common Central Sphere

Duration – 7 Hours

Learning Outcome:

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

- Organise, mark out and fabricate a fitting using the common central sphere principle
- Attach shaped patterns and cylindrical spigot using a feather-edge welded joint

Key Learning Points:

| D | Drawing and development of right conic frustum obliquely cut right cylinder. |
| M | Correct sequence of operations and materials requirements. |
| Sk | Tack welding. |
| Rk | Importance of maintaining correct angle of pipe to cone/growth in throat of fitting. |

Training Resources:

- Toolkit
- Conical bench stakes
- Notepad
- Welding consumables
- Tools and machinery/equipment
- Work samples
- Oxy-acetylene welding equipment
- Safety equipment and protective clothing
- 1mm mild steel
- Job card

Key Learning Points Code:

M = Maths  
D = Drawing  
Rk = Related Knowledge  
Sk = Skill  
P = Personal Skills  
H = Hazards
Common Central Sphere

1. Mark out elevation by putting sphere in cone at X. The diameter will be the same as pipe A.
2. From point 0 draw line which passes at a tangent to the sphere. Do the same from point 6. Where these two lines intersect we have our apex.
3. Where line 0¹ of the pipe hits line 0 of the cone is the start of our joint line. Where line 6¹ of the pipe hits line 6 of the cone is the end of our joint line.
4. Pipe A and cone B are developed as previously shown. Don’t forget to transfer lines 1 to 5 to outside of cone.
5. The joint may be butt welded but experience shows a butt joint where pipe meets cone looks poor. The heat from the weld is inclined to collapse the joint. A feather edge although creating more work gives a better finish.
6. Experience also shows that to keep an angle of 90° is difficult. Joints of this nature ‘grow’ in the throat. When marking out the pipe and cone we subtract a metal thickness from both pipe and cone. This is done at the throat where line 0 meets line 0¹. If line 0 is 80mm long we simply make it 80mm - 1 metal thickness same applies for line 0¹.
Self Assessment

Questions on Background Notes – Module 4.Unit 8

1. What dictates the diameter of the common central sphere (C.C.S)?

2. In what part of the job do we experience growth?

3. On what S.W.G would you use a feather edge weld?
Answers to Questions 1-3. Module 4.Unit 8

1. The diameter of the pipe which joins the cone dictates the diameter of the C.C.S.

2. Growth happens at the throat of the job.

3. On all S.W.G the heat from the weld makes the joint look bad. On the other jobs we tend to use feather edges on lighter S.W.G. Normally 1.00mm or lighter needs feather edge.
Index

C
Common Central Sphere, 8

S
Self Assessment, 9