

<b>Unit Title:</b>	<b>Creating 3D CAD assemblies</b>
OCR unit number	8
Level:	2
Credit value:	2
Guided learning hours:	20
Unit reference number	H/503/5861

## Unit purpose and aim

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This unit follows on the work undertaken in Unit 6 but can be delivered discreetly should the learner have access to models or knowledge of 3D solid modelling.

This unit will allow learners to develop skills in the production of 3D CAD assemblies within a parametric modelling environment. Learners will gain an understanding of the importance of constraining components within an assembly, what the different mates or constraints are and how to add a range of these.

Learners should be encouraged to develop their understanding of producing assemblies through a range of different activities. In particular, learners should be encouraged to use the software where possible to ensure the accuracy of their models.

Learning Outcomes	Assessment Criteria	Teaching Content
<p><b>The Learner will:</b></p> <p>1 Understand the importance of constraining components in assemblies</p>	<p><b>The Learner can:</b></p> <p>1.1 Explain the importance of the first component</p> <p>1.2 Explain the importance of mates</p>	<ul style="list-style-type: none"> <li>• The first component in an assembly: <ul style="list-style-type: none"> <li>○ forms the basis of relations for all other components</li> <li>○ defines the overall orientation of the assembly</li> <li>○ should be fully constrained</li> </ul> </li> <li>• Mates: <ul style="list-style-type: none"> <li>○ define the position of components in an assembly</li> <li>○ ensure an assembly is fully defined</li> <li>○ defines the range of motion available to a given component within an assembly</li> <li>○ aids motion simulation</li> </ul> </li> </ul>

Learning Outcomes	Assessment Criteria	Teaching Content
2 Be able to create assembly files	2.1 Assemble a component into an assembly file 2.2 Constrain components in relation to the assembly origin 2.3 Insert additional components into an assembly file 2.4 Apply mates within an assembly file	<ul style="list-style-type: none"> <li>• Add mates or constraints to fully define a component in relation to the origin or default work planes</li> <li>• Creation of assembly file:               <ul style="list-style-type: none"> <li>○ fully constrained. multiple components</li> </ul> </li> <li>• Mates within an assembly file:               <ul style="list-style-type: none"> <li>○ coincident</li> <li>○ offset</li> <li>○ concentric</li> <li>○ parallel</li> <li>○ angle</li> <li>○ perpendicular</li> <li>○ tangent</li> </ul> </li> </ul>
3 Be able to produce an assembly of multiple components	3.1 Assemble multiple part files 3.2 Fully constrain an assembly file	<ul style="list-style-type: none"> <li>• Creation of assembly file               <ul style="list-style-type: none"> <li>○ fully constrained. multiple components</li> <li>○ final assembly using multiple part files</li> </ul> </li> </ul>

## Assessment

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This unit is centre assessed and externally verified. In order to achieve the unit you must produce a portfolio of evidence which, on request, will need to be made available to the OCR external verifier. Portfolios of work must be produced independently and centres must confirm to OCR that the evidence is authentic.

## Evidence requirements

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This unit may be a continuation of Unit 6.

Learners will produce a range of 3D CAD assemblies containing a variety of components. Learners will evidence that they can apply a wide range of constraints in order to fully constrain assemblies. They will present their evidence in project, poster or display board form with screen shots or graphical images of their models supported with written annotation that evidences their understanding of constraints.

## Guidance on assessment and evidence requirements

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Tutors should ensure that learners gain access to a wide range of practical examples of assemblies. This unit maybe a continuation of Unit 6 where learners construct detailed assembly files of the components modelled within this unit. Tutors must ensure that the final assessment allows the learners to apply a broad range of different constraints within the final assembly.

## National Occupational Standards (NOS) mapping/signposting

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**NOS can be viewed on the relevant Sector Skills Council's website or the Occupational standards directory at [www.ukstandards.co.uk](http://www.ukstandards.co.uk).**

Occupational standards	Unit number	Title
Engineering Technical Support Suite 2 2007	TS2-02	Using and Interpreting Engineering Data and Documentation
Engineering Technical Support Suite 2 2007	TS2-04	Producing/Modifying Mechanical or Fabrication Engineering Drawings using a CAD System
Engineering Technical Support Suite 2 2007	TS2-05	Producing/Modifying Electrical or Electronic Engineering Drawings using a CAD System
Engineering Technical Support Suite 2 2007	TS2-07	Producing/Modifying Engineering CAD Models (Drawings) using a CAD System
Mechanical Manufacturing Engineering Suite 2 2008	O45NMME2-02	Using and Interpreting Engineering Data and Documentation
Mechanical Manufacturing Engineering Suite 2 2008	O45NETS3-02	Using and Interpreting Engineering Data and Documentation
Design	DES7	Contribute to the production of prototypes, models, mock-ups, artwork, samples or test pieces
Design	DES10	Create visual designs
Design	DES24	Create 3D Models using a Computer Aided Design System
Design and Draughting	O15NDD01ECSR2.04	Read and extract information from engineering drawings and specifications
Design and Draughting	O15NDD03ECSR1.19	Complete chosen engineering designs
Design and Draughting	O15NDD04ECSR2.01	Review technical information to produce detailed engineering drawings
Design and Draughting	O15NDD05ECSR2.02	Produce detailed drawings to support engineering activities

## Functional skills signposting

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This section indicates where learners may have an opportunity to develop their functional skills.

Functional Skills Standards					
English		Mathematics		ICT	
Speaking and Listening		Representing		Use ICT systems	✓
Reading	✓	Analysing		Find and select information	✓
Writing		Interpreting		Develop, present and communicate information	✓

## Resources

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### Equipment

For effective delivery of this unit centres should have access to the following resources and equipment.

- Computer system with Internet access, word processing, spread sheet, business presentation and parametric modelling software.
- 3D Parametric Modelling software e.g. Solidworks, Solid Edge, Inventor, Pro/Engineer.
- A wide range of examples, drawings and tasks.

## Additional information

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For further information regarding administration for this qualification, please refer to the OCR document '*Admin Guide: Vocational Qualifications*' (A850) on the OCR website [www.ocr.org.uk](http://www.ocr.org.uk) .