

<b>Title</b>	<b>Hot-air weld rigid plastics materials</b>		
<b>Level</b>	<b>3</b>	<b>Credits</b>	<b>8</b>

<b>Purpose</b>	People credited with this unit standard are able to: demonstrate knowledge of hot-air welding of rigid plastics materials; plan and prepare to hot-air weld rigid plastics materials in accordance with enterprise procedure; and perform hot-air welding of rigid plastics materials in accordance with enterprise procedure.
----------------	--

<b>Classification</b>	Plastics Processing Technology > Plastics Fabrication
-----------------------	---

<b>Available grade</b>	Achieved
------------------------	----------

<b>Entry information</b>	
<b>Recommended skills and knowledge</b>	Unit 20655, <i>Demonstrate knowledge of plastics materials joining techniques.</i>

### Explanatory notes

- 1 *Enterprise* means an organisation where training or assessment is taking place, and/or where the trainee is employed.
- 2 All work practices must meet enterprise health and safety requirements.
- 3 *Enterprise procedure* is defined as actions which comply with the policies, systems, and directives in a particular enterprise. Enterprise procedures must comply with the requirements of the Health and Safety in Employment Act 1992, and subsequent amendments.

---

## Outcomes and evidence requirements

### Outcome 1

Demonstrate knowledge of hot-air welding of rigid plastics materials.

#### Evidence requirements

- 1.1 The components of common hot-air welders are identified, and their purpose is described.
- Range components include – body, blower, heater, heater guard, welding tips, temperature controller, safety stand.
- 1.2 The features of different hot-air welders are described.
- Range features include – air volume range, air volume adjustment, operating temperature range, physical size, weight, temperature display, tip types, separate blower.
- 1.3 The purposes of common hot-air welding accessory tools and materials are described.
- Range hot-air welding accessory tools and materials include – scrapers, de-burring tools, wire brushes, pliers, knives, solvent cleaners.
- 1.4 Enterprise terminology is used when describing the hot-air welding process, materials and equipment.
- 1.5 The visual appearance of sound hot-air welds and common welding faults are identified.
- Range sound hot-air welds – smooth and continuous surface, side wash; common welding faults – no wash, too cold, too hot, inconsistent rod pressure, poor parent material preparation.

### Outcome 2

Plan and prepare to hot-air weld rigid plastics materials in accordance with enterprise procedure.

- Range plan and prepare – evidence is required for three different hot-air welded joints, each using a different parent plastics material, a different type of welded joint, and a different welding procedure.

**Evidence requirements**

- 2.1 Sources of hazard information associated with hot-air welding plastics materials are identified, hazards are described, and safety precautions are taken.
- Range sources may include – materials safety data sheets, company data sheets, supervisor;  
hazards include – burns, fumes, eye injuries, electrocution, poor body posture.
- 2.2 Identification techniques are carried out on the parent plastics material, and parent material and rod compatibility is verified.
- Range parent plastics materials – polyvinyl chloride, polyethylene, polypropylene, polymethylmethacrylate;  
identification techniques include – cutting, flame test, specific gravity, manufacturers' identification marks, welding rod test, parent material weldability.
- 2.3 The type of welded joint to be used is selected according to the required joint geometry, and the welding procedure is determined and planned.
- Range type of welded joint – vee-butt, overlap, fillet, tape;  
welding procedure may include – jiggling, tacking, supporting, shielding, pre-drying of parent material, rod profile.
- 2.4 Parent plastics material surface and joint preparation techniques are carried out.
- Range surface and joint preparation includes – scraping, grinding, machining, solvent cleaning.
- 2.5 A suitable hot-air welder and hot-air welding tip are selected according to the weld type, and the hot-air welding tip is fitted to the welder.
- 2.6 The hot-air welder temperature and air flow are selected and set according to weld type and the parent plastics material characteristics.

**Outcome 3**

Perform hot-air welding of rigid plastics materials in accordance with enterprise procedure.

**Evidence requirements**

- 3.1 Hot-air welding of test pieces is performed.
- Range test pieces – evidence is required for two test pieces hot-air welded with 45° vee-butt welds and a minimum length of 100mm, using different plastics materials and different gauges;  
plastics materials – polyvinyl chloride, polyethylene, polypropylene, polymethylmethacrylate;  
gauge – between 3 and 6 mm.

3.2 Welding conditions of test piece welds are monitored and controlled during the welding process.

Range welding conditions include – molten plastic bow-wave, no burning.

3.3 Key features of the completed test pieces are verified.

Range key features include – weld aesthetics, weld voids, parent material distortion.

3.4 Test piece welds meet weld short-term tensile welding factors.

Range weld short-term tensile welding factor from tensile tests for all plastics materials to be 0.6 or greater with no more than one result below this figure for each welded test piece;  
tensile tests to be in accordance with DVS-Verlag GmbH, DVS 2203-01 *Testing of welded joints of thermoplastics sheets and pipes – Test methods – Requirements* and DVS 2203-2 1985/07 *Testing of welded joints of Thermoplastics: Tensile test*;  
tensile test specimens to be prepared with an appropriate and consistent surface finish and dimensional accuracy.

3.5 Production hot-air welding is performed and checked using a mix of both hand (pendulum) welding and speed welding tips.

Range evidence is required for the production of hot-air welds using vee-butt, 90° fillet, and internal corner in each plastics material and each gauge category;  
plastics materials – polyvinyl chloride, polyethylene, polypropylene, polymethylmethacrylate;  
gauge categories – up to 2mm and greater than 4mm.

<b>Planned review date</b>	31 December 2013
----------------------------	------------------

**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	26 April 2005	N/A
Rollover and Revision	2	18 March 2011	N/A

<b>Accreditation and Moderation Action Plan (AMAP) reference</b>	0134
--	------

This AMAP can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

**Please note**

Providers must be granted consent to assess against standards (accredited) by NZQA, or an inter-institutional body with delegated authority for quality assurance, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Consent requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

---

**Comments on this unit standard**

Please contact [Competenz info@compentez.org.nz](mailto:Competenz info@compentez.org.nz) if you wish to suggest changes to the content of this unit standard.