

Title	Hot-air weld rigid plastics materials		
Level	3	Credits	15

Purpose	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; and perform hot-air welding of rigid plastics materials.
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Classification	Plastics Processing Technology > Plastics Fabrication
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Available grade	Achieved
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Guidance Information

1. Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to:
Health and Safety at Work Act 2015;
Health and Safety in Employment Regulations 1995;
German Welding Society (DVS), [DVS Media \(dvs-media.eu\)](http://dvs-media.eu);
Plastics Industry Pipe Association of Australia, Technical Guidelines, [Plastics Industry Pipe Association of Australia – PIPA](#);
and any subsequent amendments and replacements.
2. Definitions
ABS – Acrylonitrile butadiene styrene.
Accepted industry practice – approved codes of practice and standardised procedures accepted by the engineering industry as examples of best practice.
PVDF – Polyvinylidene difluoride.
Workplace procedures – procedures used by the organisation carrying out the work and applicable to the tasks being carried out. Examples are – standard operating procedures, site safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.
3. Assessment information
Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with the legislative requirements listed above and workplace procedures and meet accepted industry practice.
4. Related unit standards
It is recommended that people intending to gain credit for this unit standard first hold credit for unit standard 20655 *Demonstrate knowledge of plastics materials joining techniques*.

Outcomes and performance criteria

Outcome 1

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

Performance criteria

- 1.1 Common handheld hot air welders are described.
- Range includes – hot air blower standard tubular nozzle, hot air blower tacking nozzle, hot air blower fast/speed nozzle.
- 1.2 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.
- 1.3 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.
- 1.4 The purposes of common hot-air welding accessory tools and materials are described.
- Range hot-air welding accessory tools and materials include but are not limited to – scrapers, cutting tools, de-burring tools, wire brushes, pliers, knives, isopropyl alcohol cleaners.
- 1.5 The hot-air welding process, materials and equipment are described using industry terminology.
- 1.6 The visual appearance of sound hot-air welds and common welding faults are explained.
- Range sound hot-air welds – smooth and continuous surface, side wash; common welding faults – no wash, too cold, too hot, inconsistent rod pressure, test weld, poor parent material preparation, material compatibility.

Outcome 2

Plan and prepare to hot-air weld rigid plastics materials.

Range 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.

Performance criteria

- 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 but are not limited to – burns, fumes, eye injuries, electrocution, poor body posture.
- 2.2 Identification techniques are carried out on the parent plastics material, and parent material and the rod compatibility are verified.
- Range parent plastics materials may include – polyvinyl chloride, polyethylene, polypropylene, PVDF, ABS;
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 – jigging, 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, machining, isopropyl alcohol cleaning, procedures in accordance with DVS 2201-2.
- 2.5 A 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.

Outcome 3

Perform hot-air welding of rigid plastics materials.

Performance criteria

- 3.1 Hot-air welding of test pieces is performed.
- Range 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;
gauge – between 3mm and 30 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, discolouring, stamping.

3.4 Test specimens are prepared for testing by third party.

Range test specimens are prepared ensuring conformance to DVS standards requirement for testing welded joints.

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;
plastic materials – polyvinyl chloride, polyethylene, polypropylene;
gauge – between 3mm and 30mm.

3.6 Weld quality is achieved to industry standard.

Range weld certification, stamping.

Planned review date	31 December 2027
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 April 2005	31 December 2025
Rollover and Revision	2	18 March 2011	31 December 2025
Review	3	26 October 2023	N/A

Consent and Moderation Requirements (CMR) reference	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Hanga-Aro-Rau Manufacturing, Engineering and Logistics Workforce Development Council qualifications@hangaarorau.nz if you wish to suggest changes to the content of this unit standard.