Department of Labour
TE TARI MAHI

WELDING HEALTH AND SAFETY ASSESSMENT TOOL

This detailed assessment tool is for use by employers, health and safety committees, individuals and Department of Labour health and safety inspectors to assist in the auditing of workplaces where electric or gas welding or cutting is carried out.

The aim of the audit is to lead a discussion through the essential elements of welding/cutting safe practice so that workplace participants may decide where improvements are required.

A briefer tool is available that summarises the essential elements of welding safety under the same headings.

The assessment tool has 20 sections as follows:
(You may not need to complete all sections.)

BEFORE ANY WELDING OCCURS

1. Basic hazards of welding
2. Training and certification
3. Process and equipment selection

GENERAL WELDING SAFETY

4. General health and safety
5. Fire prevention and hotwork
6. Personal protective equipment
7. Fume and gas control
8. Local exhaust ventilation

SPECIFIC WELDING SAFETY ISSUES

9. Electrical safety
10. Safe use of welding gases
11. Hazardous substances
12. Metal preparation
13. Welding in confined spaces
14. Hot metal sparks
15. Radiation

GENERAL SAFETY ISSUES

16. Working technique
17. Noise and vibration
18. Manual handling
19. Hand tool fitness and safety
20. Requirements of the Health and Safety in Employment Act 1992

Welding health and safety publications

The Department of Labour has adopted *Health and Safety in Welding 2004* (TN7) published by the Welding Technical Institute of Australia (WTIA) as its standard for welding safety. Copies may be obtained from:

Heavy Engineering Research Association (HERA)
PO Box 76 134 Manukau City
Auckland

A short booklet summarising welding health and safety essentials is available from the Department of Labour. It is designed for use by supervisors and members of industry training organisations (ITOs).

The sections in this assessment tool correspond to those in the booklet.

Before any welding occurs

BASIC HAZARDS OF WELDING

1. Are any of the following hazards of welding present?

Fires	☐ Yes	☐ No
Burns	☐ Yes	☐ No
Fumes	☐ Yes	☐ No
Electric shock	☐ Yes	☐ No
Compressed gases	☐ Yes	☐ No
Hazardous substances	☐ Yes	☐ No
Heat stress	☐ Yes	☐ No
Toxic gases	☐ Yes	☐ No
Asphyxiant gases (suffocation)	☐ Yes	☐ No
Radiation	☐ Yes	☐ No
Heat stress	☐ Yes	☐ No
Suffocation	☐ Yes	☐ No
Noise and vibration	☐ Yes	☐ No
Manual handling	☐ Yes	☐ No

2. Comment on the general knowledge of health and safety in welding

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3. Comment on the general knowledge of the standard ways to prevent these hazards causing harm

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TRAINING AND CERTIFICATION

4. Are welders certified for the job they are doing and in the basic elements of welding health and safety?

Certification for job competency (including knowledge of correct use of welding equipment)	☐ Yes	☐ No
Certification for health and safety in welding (e.g. unit standard 21907)	☐ Yes	☐ No
Is management aware of the range of unit standards for welding?	☐ Yes	☐ No

5. Do all operators have a copy of the appropriate operating instructions for the equipment they use?

☐ Yes ☐ No ☐ Not applicable

6. Are welders trained in the use of:

Fire extinguishers	☐ Yes	☐ No	
Hot work permits	☐ Yes	☐ No	☐ Not applicable

PROCESS AND EQUIPMENT SELECTION

7. What types of welding or cutting are carried out?

Manual metal arc welding (MMAW)	☐ Yes	☐ No
Gas tungsten arc welding (TIG)	☐ Yes	☐ No
Gas metal arc welding (MIG)	☐ Yes	☐ No
Flux cored arc welding (FCAW)	☐ Yes	☐ No
Submerged arc welding (SAW)	☐ Yes	☐ No
Electroslag welding (ESW)	☐ Yes	☐ No
Electrogas welding (EGW)	☐ Yes	☐ No
Arc cutting	☐ Yes	☐ No
Plasma arc welding	☐ Yes	☐ No
Gas welding, cutting or gouging	☐ Yes	☐ No
Other	☐ Yes	☐ No

(Please describe)

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8. What types of electrode are being used?

Cellulosic (TiO_2, sand, and magnesium silicate)	☐ Yes	☐ No
Rutile (TiO_2, $CaCO_3$ plus some cellulose)	☐ Yes	☐ No
Basic (high content of calcium carbonate or fluoride)	☐ Yes	☐ No
Other	☐ Yes	☐ No

(Please describe)

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9. What diameter electrodes are in use?

☐ mm

10. What metals are involved in the welding (either as the metal being welded, as a coating on the metal or as part of the welding consumables)?

Aluminium	☐ Yes	☐ No
Bronze	☐ Yes	☐ No
Brass	☐ Yes	☐ No
Copper	☐ Yes	☐ No
Mild steel	☐ Yes	☐ No
Stainless steel	☐ Yes	☐ No
Galvanised*	☐ Yes	☐ No
Ni/Cr*	☐ Yes	☐ No
Leaded metals*	☐ Yes	☐ No
Cadmium*	☐ Yes	☐ No
Berylium*	☐ Yes	☐ No
Manganese*	☐ Yes	☐ No
Other	☐ Yes	☐ No

(Please describe)

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* Fumes generated by these metals are extremely toxic.

11. Are any coatings applied to the material being welded? (All may be toxic or highly toxic.)

Metallic (zinc, aluminium, copper, nickel, cadmium)	☐ Yes	☐ No
Paints (lead, zinc, chromium, phosphate, cadmium)	☐ Yes	☐ No
Plastics (possibility that ammonia, hydrochloric acid, carbon dioxide, cyanides etc. will be generated.)	☐ Yes	☐ No
Degreasing agents and oils	☐ Yes	☐ No

12. What gases are being used for welding?

Argon	☐ Yes	☐ No
Helium	☐ Yes	☐ No
LPG	☐ Yes	☐ No
Acetylene	☐ Yes	☐ No
Oxygen	☐ Yes	☐ No
Carbon dioxide	☐ Yes	☐ No

13. What is the duration of the welding activity?

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14. Comments:

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General welding safety

GENERAL HEALTH AND SAFETY

15. Does work stop if there is the smell of gas?

☐ Yes ☐ No ☐ Not applicable

16. Are welding cables and hoses kept clear of passageways, ladders and stairways?

☐ Yes ☐ No ☐ Not applicable

17. Do booths and screens permit air circulation at the floor level? (At least 50 cm of space is recommended at the bottom of the screens.)

☐ Yes ☐ No ☐ Not applicable

18. Are employees working nearby protected from arc flash by screens, booths or shields?

☐ Yes ☐ No ☐ Not applicable

19. Are work areas:

Well lit (300 lux or more)	☐ Yes	☐ No
Properly ventilated	☐ Yes	☐ No
Well arranged	☐ Yes	☐ No
Tidy	☐ Yes	☐ No

20. Are signs reading: "Danger, No Smoking, Matches, or Open Lights" or the equivalent posted?

☐ Yes ☐ No ☐ Not applicable

21. Are hazardous materials properly labelled?

☐ Yes ☐ No ☐ Not applicable

22. Are safety data sheets available?

☐ Yes ☐ No ☐ Not applicable

23. Is first aid equipment for welders immediately available at all times?

☐ Yes ☐ No ☐ Not applicable

FIRE PREVENTION AND HOT WORK

24. Are all moveable fire hazards and combustibles moved to at least 10 metres away from area or objects to be welded?

☐ Yes ☐ No ☐ Not applicable

25. When welding or cutting operations are done within 10 metres of combustible materials or floor, ceiling or wall openings, are guards, barriers, or other precautions used to confine heat, sparks and slag?

☐ Yes ☐ No ☐ Not applicable

26. If all hazards cannot be eliminated or isolated or when the floor, ceiling or wall has openings in it, special precautions may be necessary. Which of the following are being taken?

Fire watchers are present during and up to 30 minutes after the job is done	☐ Yes	☐ No
Having an inspection conducted before beginning work	☐ Yes	☐ No
Covering or wetting combustible materials	☐ Yes	☐ No
Covering or shutting down ventilation ducts and conveyors	☐ Yes	☐ No

27. Are sprinkler systems inoperable? ☐ Yes* ☐ No

Do unusual fire explosion hazards exist? ☐ Yes* ☐ No

*If yes to either of these questions, welding is prohibited.

28. Are fire watchers or wardens assigned when welding or cutting is performed, in locations such as confined spaces and boats, where a serious fire might develop?

☐ Yes ☐ No ☐ Not applicable

29. Are combustible floors kept wet, covered by damp sand, or protected by fire-resistant shields?

☐ Yes ☐ No ☐ Not applicable

30. When combustible floors are wet, are personnel protected from possible electric shock?

☐ Yes ☐ No ☐ Not applicable

31. When welding is carried out on metal walls, are precautions taken to protect combustibles on the other side?

☐ Yes ☐ No ☐ Not applicable

32. Is welding prohibited where flammable materials (such as paints) are used or where heavy dust concentrations are present?

☐ Yes ☐ No ☐ Not applicable

33. Is suitable fire extinguishing equipment kept where welding or cutting is done? Is this equipment ready for instant use and are workers trained in its use?

☐ Yes ☐ No ☐ Not applicable

34. Before hot work is begun, are used drums, barrels, tanks and other containers so thoroughly cleaned and purged that no substances remain that could explode, ignite or produce toxic vapours?

☐ Yes ☐ No ☐ Not applicable

35. Before welding or cutting of containers, are all hollow spaces and cavities vented and purged to release trapped air or gases?

☐ Yes ☐ No ☐ Not applicable

36. Are all gas regulators and operators' opveralls and gloves free of oil and grease (that might react with oxygen from a cylinder).

☐ Yes ☐ No ☐ Not applicable

37. Is the danger of substituting oxygen for compressed air in gas lines understood?

☐ Yes ☐ No ☐ Not applicable

38. Do operators know how to use gas equipment safely?

☐ Yes ☐ No ☐ Not applicable

39. Is it standard practice to avoid letting gas lines lie in confined spaces (in case leaks allow flammable/ explosive concentrations of gas to build up)?

☐ Yes ☐ No ☐ Not applicable

40. Comments

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PERSONAL PROTECTIVE EQUIPMENT

41. Is the following basic protective clothing supplied - preferably wool and leather:

Welding helmet	☐ Yes	☐ No
Eye protection	☐ Yes	☐ No
Overalls with long sleeves, fastenable at the wrist and neck	☐ Yes	☐ No
Fire-resistant gauntlet gloves	☐ Yes	☐ No
Apron	☐ Yes	☐ No
Spats or leggings	☐ Yes	☐ No

42. Is the following protective clothing supplied as required:

Cap	☐ Yes	☐ No
Neck covering (when welding in confined spaces)	☐ Yes	☐ No
Steel-capped boots		
Hearing protection	☐ Yes	☐ No

43. For the eye protection supplied:

Are the ultraviolet (UV) radiation filters suitable for the task?	☐ Yes	☐ No
Are the goggles supplied suitable for eye protection during metal preparation or de-slagging?	☐ Yes	☐ No

44. Is respiratory protection needed?

☐ Yes ☐ No ☐ Not applicable

45. If Yes to question 44, is the respiratory protection programme able to protect to the required level?

☐ Yes ☐ No ☐ Not applicable

46. Comments

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FUME AND GAS CONTROL

47. Which of the following have been identified as hazards in this workplace?

Aluminium	☐ Yes	☐ No
Barium	☐ Yes	☐ No
Beryllium	☐ Yes	☐ No
Cadmium	☐ Yes	☐ No
Chromium	☐ Yes	☐ No
Cobalt	☐ Yes	☐ No
Copper	☐ Yes	☐ No
Iron	☐ Yes	☐ No
Lead	☐ Yes	☐ No
Magnesium	☐ Yes	☐ No
Manganese	☐ Yes	☐ No
Mercury	☐ Yes	☐ No
Nickel	☐ Yes	☐ No
Silver	☐ Yes	☐ No
Tin	☐ Yes	☐ No
Titanium	☐ Yes	☐ No
Tungsten	☐ Yes	☐ No
Vanadium	☐ Yes	☐ No
Zinc	☐ Yes	☐ No
Fluorides	☐ Yes	☐ No
Nitrogen dioxide	☐ Yes	☐ No
Ozone	☐ Yes	☐ No
Phosgene	☐ Yes	☐ No
Phosphine	☐ Yes	☐ No
Nitrogen oxides	☐ Yes	☐ No
Carbon monoxide	☐ Yes	☐ No
General welding fumes	☐ Yes	☐ No

48. Are inert gases used in shielding capable of building up and depleting the oxygen in the atmosphere?

☐ Yes ☐ No ☐ Not applicable

If Yes, give details

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49. Can the interaction of the welding arc and degreasing agents lead to the formation of phosgene?

☐ Yes ☐ No ☐ Not applicable

50. Are fumes generated by fluxing agents in welding rods, welding pastes and silver brazing fluxes likely to cause allergic reactions?

☐ Yes ☐ No ☐ Not applicable

51. Is the risk posed by any of these hazards made worse by work in confined spaces?

☐ Yes ☐ No ☐ Not applicable

52. Comments

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LOCAL EXHAUST VENTILATION

53. Where is the welding being carried out?

Open workshop	☐ Yes	☐ No
Screened area in workshop	☐ Yes	☐ No
Booth	☐ Yes	☐ No
Confined space	☐ Yes	☐ No
Open area outside	☐ Yes	☐ No
Other	☐ Yes	☐ No

54. Which of the following methods of ventilation are in use?

Ventilation slot on rear of bench	☐ Yes	☐ No
Specific purpose ventilation	☐ Yes	☐ No
Gun-mounted ventilation	☐ Yes	☐ No
Relocatable hoods	☐ Yes	☐ No

55. Is there welding of the metals listed in table 17.2 of *Health and Safety in Welding - 2004* (TN7) (i.e. aluminimum, barium, cadmium, zinc, beryllium, lead, chromium, cobalt, copper, fluorides, manganese, nickel or mercury)?

☐ Yes* ☐ No ☐ Not applicable

*If Yes, local exhaust ventilation **MUST** be provided.

56. Is welding been done in a confined space?

☐ Yes* ☐ No ☐ Not applicable

*If Yes, local exhaust ventilation **MUST** be provided.

57. In a workshop, is mechanical ventilation provided in a workshop when:

There is less than 300 cubic metres of space per welder?	☐ Yes	☐ No
The ceiling height is less than 5 metres?	☐ Yes	☐ No
There are numbers of people working in the area?	☐ Yes	☐ No
Special hazards are generated by the welding?	☐ Yes	☐ No

58. Is contaminated air exhausted from a working space discharged into the open air and away from sources of fresh intake air?

☐ Yes ☐ No ☐ Not applicable

59. Have preservative coatings been stripped from the object so that the temperature of the unstripped metal will not be appreciably raised?

☐ Yes ☐ No ☐ Not applicable

60. Are toxic preservative surfaces removed to at least 10 cm away from the area of heat application, and/or is suitable respiratory protection provided?

☐ Yes ☐ No ☐ Not applicable

61. Comments

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Specific welding safety issues

ELECTRICAL SAFETY

62. Safe equipment selection

Is the open circuit (no load) voltage of arc welding and cutting machines as low as possible and not in excess of the recommended limits? ☐ Yes ☐ No

Under wet conditions, are automatic controls for reducing no-load voltage used? ☐ Yes ☐ No

Are proper earthing clamps and cable connectors used? ☐ Yes ☐ No

Are the grounding (earthing) of portable welding machines and safety ground connections checked periodically? ☐ Yes ☐ No

Are wet machines thoroughly dried and tested before being used? ☐ Yes ☐ No

Do means for connecting cables together have adequate insulation? ☐ Yes ☐ No

Is electrical polarity preserved when using two welding machines on electrically connected materials? ☐ Yes ☐ No

Are appropriate rod holders used (AS 2826)? ☐ Yes ☐ No

Are the shortest possible leads used and are they capable of carrying the required current safely? ☐ Yes ☐ No

Is a residual current device (RCD) used with hand-held power tools? ☐ Yes ☐ No

Are appropriately rated powerboards used, rather than double adaptors or piggyback plugs? ☐ Yes ☐ No

63. Safe use of equipment. Does the welder know:

Not to coil or loop welding electrode cable around his or her body? ☐ Yes ☐ No

To remove electrodes from the holders when not in use? ☐ Yes ☐ No

To shut off power to the welder when no one is in attendance? ☐ Yes ☐ No

The hazards of welding where water is present (showers, kitchens, boats, spas and swimming pools etc.)? ☐ Yes ☐ No

The hazards of igniting flammable gas or solvent vapour with an electrical spark? ☐ Yes ☐ No

To operate the welding equipment within its rated duty cycle? ☐ Yes ☐ No

Never to twist or knot a lead, bend it sharply or tack it to a wall? ☐ Yes ☐ No

To dry their hands before doing any welding? ☐ Yes ☐ No

To disconnect electrical equipment immediately after use? ☐ Yes ☐ No

To pull on the plug, not the lead, to unplug equipment? ☐ Yes ☐ No

64. Inspection and repair of equipment

Work and electrode lead cables are frequently inspected for wear and damage, and replaced when necessary. ☐ Yes ☐ No

Frayed or cracked leads and fittings or broken switches and cover plates are not used or allowed to be used while waiting for repairs. ☐ Yes ☐ No

The electrical safety of the rod holder or welding hand-piece is checked regularly, and maintained or replaced as required. ☐ Yes ☐ No

65. If a petrol motor generator is used to power a welding set, look out for carbon monoxide fumes, especially in confined spaces.

66. Comments

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SAFE USE OF WELDING GASES

67. Maintenance of gas bottle integrity.

Are cylinders correctly labelled? ☐ Yes ☐ No

Are cylinders stored in a ventilated area? ☐ Yes ☐ No

Are cylinders properly secured against falls? ☐ Yes ☐ No

Are fuel gas cylinders and oxygen cylinders stored separately? ☐ Yes ☐ No

Are gas cylinders kept away from sources of heat and electrical apparatus? ☐ Yes ☐ No

Are acetyline cylinders stored upright? ☐ Yes ☐ No

Are gas cylinders regularly examined for obvious signs of defects, rusting or leakage? ☐ Yes ☐ No

Are empty cylinders appropriately marked, their valves closed and valve protection caps on? ☐ Yes ☐ No

68. Integrity of equipment connected to gas cylinders

Is the inspection of the integrity of the equipment fitted to gas cylinders performed routinely? ☐ Yes ☐ No

Are cylinders, cylinder valves, couplings, regulators, hoses and apparatus kept free of oily or greasy substances? ☐ Yes ☐ No

Is red used to identify the acetylene (and other fuel-gas) hoses, green for oxygen hoses and black for inert gas and air hoses? ☐ Yes ☐ No

Are flashback arrestors fitted? ☐ Yes ☐ No

Is the use of copper piping with acetylene avoided? ☐ Yes ☐ No

69. Correct usage of gas equipment

Do operators know the correct assembly procedures for attaching equipment to gas cylinders? ☐ Yes ☐ No

Do operators know the correct procedures and materials (detergent not soap) for leak testing? ☐ Yes ☐ No

Do operators know the correct procedures for lighting gas torches? ☐ Yes ☐ No

Do operators know the signs of a flashback, what to do in response, how to check if damage has occurred to equipment and the actions necessary if it has occurred? ☐ Yes ☐ No

Are workers instructed to never crack a fuel gas cylinder valve near sources of ignition? ☐ Yes ☐ No

Before a regulator is removed, is the valve closed and gas released from the regulator? ☐ Yes ☐ No

Is the use of LPG avoided in holes and trenches (where it can pool at a low level)? ☐ Yes ☐ No

Do operators know NOT to use oxygen to dust off clothing? ☐ Yes ☐ No

Do operators know NOT to use oxygen to 'sweeten' the atmosphere? ☐ Yes ☐ No

70. Comments

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HAZARDOUS SUBSTANCES

71. List any hazardous substances not covered by the above that are being used.

Nitric acid

Hydrofluoric acid ☐ Yes ☐ No

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72. What procedures are in place to ensure the safe use of hazardous substances listed in question 71?

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METAL PREPARATION

73. Which, if any, of the following five surface preparation methods are in use?

Abrasive blasting ☐ Yes ☐ No

Mechanical preparation ☐ Yes ☐ No

Degreasing chemicals ☐ Yes ☐ No

Acid or caustic solutions ☐ Yes ☐ No

Contaminated surfaces ☐ Yes ☐ No

74. What methods are used to control the hazards from question 73?

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WELDING IN CONFINED SPACES

75. Are all welding operations in confined spaces carried out with careful consideration of the following:

Space ventilation – The exact type should be determined by the processes being carried out ☐ Yes ☐ No

Use of gas hoses – Remove gas hoses and torches from confined spaces every time work stops - even for short breaks. ☐ Yes ☐ No

Personal respiratory equipment – This will be required under certain circumstances. ☐ Yes ☐ No

Safe access – This is required and pre-planned emergency rescue must be assured through the use of suitable emergency equipment. ☐ Yes ☐ No

An observer must be stationed outside the space.

Atmospheric testing – The atmosphere in a confined space may become depleted in oxygen content. Check with a monitoring device before entry. As welding proceeds, inert gases may displace oxygen – check the atmosphere periodically. Check also for toxic or explosive atmospheres if appropriate. ☐ Yes ☐ No

Personnel training – Welders and observers must be properly trained. ☐ Yes ☐ No

Electrical safety – A range of measures are described in *Health and Safety in Welding - 2004* (TN7), including having an observer outside the space with access to a cut-off switch. ☐ Yes ☐ No

Reflected arc flash in a confined space – This may affect bare skin (back of the neck). ☐ Yes ☐ No

Heat stress – Confined spaces may be hot because of solar load (if outside), or may become hot during the process or because of preheating. Take precautions to prevent these conditions affecting the worker. ☐ Yes ☐ No

Working in a confined space (especially if hot) can affect a welder, given the level of protective equipment required, and it may be necessary to limit the welder's working time.

A permit-to-work system may be used. ☐ Yes ☐ No

HOT METAL SPARKS

76. Is the housekeeping adequate?

☐ Yes ☐ No ☐ Not applicable

77. Does appropriate flame-resistant personal protective equipment prevent sparks entering clothing and boots?

☐ Yes ☐ No ☐ Not applicable

RADIATION

78. Are the dangers of arc flash through the side of the eye understood?

☐ Yes ☐ No ☐ Not applicable

79. Are all parts of the body covered against ultraviolet and infrared rays and flash burns?

☐ Yes ☐ No ☐ Not applicable

80. Are bystanders and other workers protected against arc flash?

☐ Yes ☐ No ☐ Not applicable

81. Are you aware that, in gas arc welding process, flat hand-shields provide insufficient protection from reflected radiation?

☐ Yes ☐ No ☐ Not applicable

82. Comments

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General safety issues

WORKING TECHNIQUE

83. Does the operator know to keep his or her head out of the welding plume?

☐ Yes ☐ No ☐ Not applicable

NOISE AND VIBRATION

Noise

Noise levels can be hazardous during some welding and metal cleaning processes.

The Department of Labour publication *Approved Code of Practice for the Management of Noise in the Workplace* should be followed in identifying noise sources, assessing their significance and applying control measures.

Health and Safety in Welding - 2004 (TN7) refers to Australian noise control practices, and, while much of the information it carries is relevant generally, it should not be referred to for methods of noise assessment.

Audiometry will be required where employees are exposed to hazardous levels of noise.

Describe any required follow-up action on noise.

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Vibration

The prolonged use of powered hand tools may expose welders to harmful levels of vibration, resulting in decreased blood circulation in the fingers.

The effect of vibration is exacerbated when working in the cold.

Exposure to vibration can be reduced by good tool design and selection, regular tool maintenance and the wearing of gloves.

85. Describe any follow-up action on vibration issues suggested by this checklist.

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MANUAL HANDLING

86. Are any of the following behaviours involved in the task?

Twisted, stooped, awkward asymmetrical postures	☐ Yes	☐ No
Fixed, sustained, rigid or prolonged postures	☐ Yes	☐ No
Unvaried, repetitive movements	☐ Yes	☐ No
Sudden, uncontrolled or jerky movements	☐ Yes	☐ No
Handling or reaching away from the body	☐ Yes	☐ No
Using high or sustained force	☐ Yes	☐ No
Handling heavy or awkward loads	☐ Yes	☐ No
Whole-body vibration or hand-arm vibration	☐ Yes	☐ No
Handling that goes on for too long without a break	☐ Yes	☐ No

87. Describe any follow-up action on manual handling issues suggested by this checklist.

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HAND TOOL FITNESS AND SAFETY

88. Hand tools used in metal preparation and weld treatment can pose several types of hazard. Do any of the following issues need attention?

Electrically-powered tools (grinders) pose a risk of shock. Check electrical safety regularly and use RCD devices. ☐ Yes ☐ No

Electrical or heat insulation on the tool handle requires repair. ☐ Yes ☐ No

Tools used for deslagging, grinding and chipping pose hazards to the eyes. Eye protection is worn to address this hazard. ☐ Yes ☐ No

Poorly maintained hand tools are used which may result in injuries from vibration. ☐ Yes ☐ No

The physical design of hand tools is not based on ergonomic principles and poses the risk of a musculoskeletal disorder. ☐ Yes ☐ No

Air-powered tools can discharge cold air over the hands. ☐ Yes ☐ No

Using tools with wet or sweaty hands may compromise electrical safety or cause the hands to slip. ☐ Yes ☐ No

The tool weight, the trigger design, the grip, the handle diameter and the tool shape compromise ease of use. ☐ Yes ☐ No

REQUIREMENTS OF THE HEALTH AND SAFETY IN EMPLOYMENT ACT 1992

89. Information, training and supervision

Have employees been given information about the hazards they face? ☐ Yes ☐ No

Have employees been given training on how to do the work the right way and on controlling hazards? ☐ Yes ☐ No

Are employees supervised until they can carry out the work safely? ☐ Yes ☐ No

90. Protective equipment

Are employees provided with adequate protective equipment? ☐ Yes ☐ No

91. Monitoring

Is environmental monitoring carried ☐ Yes ☐ No

Is personal health monitoring carried out? ☐ Yes ☐ No

92. Employee involvement

Are employees involved in health and safety matters? ☐ Yes ☐ No

93. Comments

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WELDING FUME CONTROL – SUMMARY WORKSHEET

94. This worksheet can be used to obtain an idea of the level of protection required for the different welding processes.

A. Select a process weighting factor

Process	Weighting
Submerged arc welding (remote operation) Laser cutting and welding Micro plasma Gas cutting (remote operations)	0
Submerged arc welding (manual) Submerged arc welding (multi arcs)	2
Brazing (manual operation) Gas tungsten arc welding (TIG) (manual operation) Gas welding and cutting (manual) Silver soldering (manual) Resistance spot welding (manual) Plasma cutting (under water table) Plasma arc welding Gas metal arc welding (MIG) (remote operation) Resistance seam welding (remote operation) Electroslag welding	4
MIG (hand-held) Manual metal arc welding (MMAW) Resistance seam welding (manual operations) Thermit welding Electrogas welding	7
Arc cutting Plasma arc gouging Air arc gouging Flux cored arc welding (manual and remote operation)	9
Plasma arc cutting	15

B. Select a fume constituent weighting

Fume group		Weighting
A	Iron, aluminium, tin, titanium – less than 5% of group B or C or less than 0.05% of group D.	0
B	Copper, magnesium, manganese, molybdenum, silver, tungsten, zinc. Flux fumes such as fluorides, rosin, phosphor acid, zinc chloride and boric acid.	10
C	Barium, chromium, cobalt, lead, nickel, ozone, vanadium, phosgene, organic fume.	20
D	Beryllium, cadmium.	55

C. Select a work location weighting

Work location	Weighting
Outdoor workspace	0
Open workspace	12
Limited workspace	16
Confined workspace	24

D. Add the three weightings you obtain at A, B and C to determine the control actions needed as below:

Sum of weighting factors	Controls
≤ 9	Natural ventilation
> 9 to 21	Mechanical ventilation
> 21 to 54	Local exhaust ventilation
> 54	Local exhaust ventilation and respiratory protection