

# Hazardous substances – welding fume assessment >

**The purpose of this information bulletin is to provide practical guidance on fume assessment and control in the workplace. The completed bulletin can provide a record of the assessment.**

## Legislation

The Northern Territory [Work Health \(Occupational Health and Safety\) Regulations](#) require employers to identify hazards in the workplace. The fume assessment, outlined in this bulletin, will assist employers to assess the risk and to put into place appropriate control measures to minimise the effect of hazardous fumes generated by processes such as welding, cutting, brazing, gouging or soldering.

The fume assessment provides a quick and easy method for determining the level of ventilation required to reduce the risk of adverse health effects for employees who are exposed to hazardous fumes in their day to day workplace activities.

Specific Material and Electrode Safety data sheets should be provided and consulted when conducting a risk assessment.

**Remember to identify all other hazards associated with this work and include these in your risk assessment.**

The concept, and values used in this bulletin were prepared by the Welding Technology Institute of Australia (WTIA) and WorkCover.



putting safety first >

Occupiers name \_\_\_\_\_

Workplace address \_\_\_\_\_  
\_\_\_\_\_

Telephone \_\_\_\_\_

Facsimile \_\_\_\_\_

Activity/hazard assessed \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date of fume assessment \_\_\_\_\_

### Procedure for Selecting a Fume Control System

Choose the appropriate (F) number from step 1-2-3 below and place in the boxes provided below step 3, add these numbers together to obtain a TOTAL (F) number.

Step 1	Welding Process	(F)
<b>Process</b>		
Electrode gas welding Electroslag welding (ESW) and consumable Guide welding Submerged arc welding (SAW)		2
Brazing Gas tungsten arc welding (GTAW, TIG) Gas welding/cutting Silver soldering, standard soldering		4
Arc cutting Gas metal arc welding (CMAW, MIG) Manual metal arc welding (MMAW) Plasma arc welding (PAW) Resistance welding Thermit welding Plasma gouging		7
Arc air gouging Flux cored arc welding (FCAW)		9
Plasma arc cutting		15

<b>Step 2</b>	<b>Type of Metal and Fume Hazard</b>	<b>(F)</b>
<b>Material</b>	<b>Fume Hazard</b>	
Aluminium (flake paint spray powder and wires)	Aluminium	0
Aluminium and its alloys (plated extrusions, castings, welding consumable etc)	Ozone	20
Aluminium bronze	Copper	10
Braze and bronze	Copper	10
Brazing filters Cadmium bearing Cadmium free	Cadmium Copper	50
Brazing fluxes	Fluorides	10
Casting, iron welding electrodes for bronze type	Copper	10
Nickel/nickel iron type	Nickel	20
Coating, metal on steel Cadmium Chromium Copper Lead Nickel Tin Zinc	Cadmium Chromium Copper Lead Nickel Tin Zinc	50 20 10 20 20 0 10
Coating plastic on steel	Organic	20
Copper and its alloys Copper, brass or bronze Copper-beryllium alloy	Copper Beryllium	10 50
Degreasing agents Chlorinated hydrocarbons decomposition products	Phosgene	20
Dissimilar metal joints High alloy stainless electrodes Nickel alloy electrodes	Chromium Nickel	20 20
Galvanised steel (hot zinc dipped, or plated, zincalume)	Zinc	10
Lead, lead coated steel	Lead	20
Low hydrogen electrode (basic)	Fluorides	10
Magnesium and its alloys Plate extrusions and casting dusts	Magnesium	10
Metal spraying Aluminium Molybdenum Lead Zinc	Aluminium Molybdenum Lead Zinc	0 10 20 10

<b>Step 2</b>	<b>Type of Metal and Fume Hazard</b>	<b>(F)</b>
<b>Material</b>	<b>Fume Hazard</b>	
Other metals in paint		
Aluminium flake	Aluminium	0
Lead chromate	Chromium	20
Red lead	Lead	20
Zinc chromate	Chromium	10
Paint coatings on steel etc		
Cadmium based	Cadmium	50
Epoxy type	Organic	20
Weld through primers	Organic	20
Zinc based	Zinc	10
Plated steel etc		
Cadmium	Cadmium	50
Chromium	Chromium	20
Zinc (see galvanised steel)	Zinc	10
Soldering flux		
Active	Zinc chloride	10
Broax/borate	Boric acid	10
Safety/resin	Colophony	10
Stainless steel	Phosphoric acid	10
Solders		
Silver solder cadmium based	Cadmium	50
Silver solder cadmium free	Silver	10
Tin-lead soft solder	Lead	20
Steel types		
All	Iron	0
Austenitic magnesium wear resistance	Magnesium	10
Cryogenic steels 91% nickel	Nickel	10
Leaded steel	Lead	20
Maraging steels	Lead	20
Stainless steel	Chromium	20
Tool steels > 5% CR	Chromium	20
Surfacing (hardfacing) consumable	Chromium	20

Note: Where more than one Fume Hazard is present use the highest (F) number.

Step 3	Work Position	(F)
<b>Position</b>		
Outdoor		0
Open workspace, where all of the below must hold: Welder keeps heads out of plume Roof of high wall vents exist Free cross flow ventilation exists Av space per welder exceeds 300m <sup>3</sup>		12
Limited workspace which includes: Welding bays Areas with welding screens, curtains, etc		16
Confined workspace which include: Spaces defined in AS2865 Pits, tanks, vessels, vats, pipes, flues		24

Step 1

Step 2

Step 3

Total: (F) =

From the table below choose the appropriate box with the number which best fits TOTAL (F) from above. This then becomes the preferred requirements for fume control:

### Fume control requirement

Total	Requirement	Total (F)	Requirement
2 to 9	Natural ventilation (eg, open doorway)	21 to 53	At source extraction
10 to 20	Mechanical dilution ventilation	54+	At source extraction plus respiratory protection

At source fume extraction equipment which may be required (contact supplier for appropriate equipment to be used):

Filtered	<input type="checkbox"/>	Non filtered	<input type="checkbox"/>	Fixed	<input type="checkbox"/>
Mobile	<input type="checkbox"/>	Portable	<input type="checkbox"/>	In-bench system	<input type="checkbox"/>
Stand alone inlet	<input type="checkbox"/>	On-gun inlet	<input type="checkbox"/>		

Respiratory equipment which may be required (contact supplier for appropriate equipment to be used):

Disposable	<input type="checkbox"/>	Reusable	<input type="checkbox"/>	Powered (PAPR)	<input type="checkbox"/>
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**Comments:**

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**Name of person  
conducting assessment**

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**Signature**

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**Date**

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**Resources**

- Northern Territory of Australia Work Health (Occupational Health and Safety) Regulations, 1996
- Workplace Australia “Control of Workplace Hazardous Substances, National Model regulations [[NOHSC: 1005](#) (1994)] and National Code of Practice [[NOHSC: 2007](#) (1994)]”.
- Worksafe Australia “Guidance Note for the Assessment of Health Risks Arising from the use of Hazardous Substances in the workplace [[NOHSC: 3017](#) (1994)].
- WTIA Fume Minimisation Guidelines.
- WTIA TN 7-94, Health and Safety in Welding.

**NT WorkSafe >**

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