Manufacturing Industry Skills Alliance

Appendix B:

Sub-Sector Analysis

This sub-sector analysis draws on available data from JSA, ABS and NCVER to paint a picture of each sub-sector, highlighting particular economic, geographic and demographic features of businesses in the sub-sector, their workers, and enrolment and completion data for relevant training packages.

For each sub-sector a summary of data insights is followed by a summary of themes that emerged from stakeholder engagement performed by the Manufacturing Alliance. The themes have been compiled from de-identified data and thus do not include citations.

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All Manufacturing across the Manufacturing Alliance remit

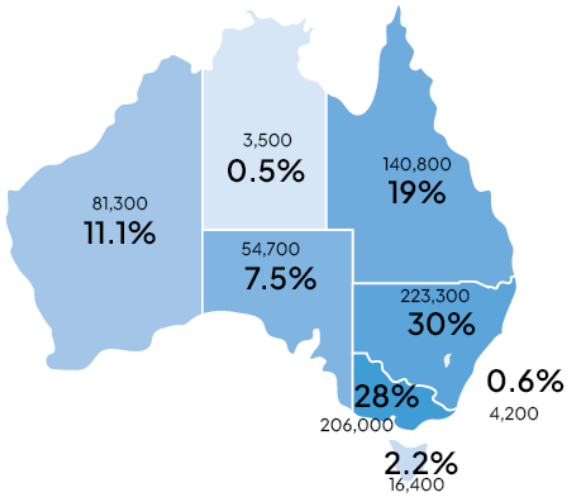
COVERAGE: ANZSIC Industry Classifications

12 Beverage and Tobacco Product Manufacturing
16 Printing (including the Reproduction of Recorded Media)
17 Petroleum and Coal Product Manufacturing
18 Basic Chemical and Chemical Product Manufacturing
19 Polymer Product and Rubber Product Manufacturing

21 Primary Metal and Metal Product Manufacturing
22 Fabricated Metal Product Manufacturing
24 Machinery and Equipment Manufacturing
11 Food Product Manufacturing *excl. 111 Meat and Meat Product Manufacturing and 112 Seafood Processing*
20 Non-Metallic Mineral Product Manufacturing *excl. 201 Glass and Glass Product Manufacturing*

239 Other Transport Equipment Manufacturing (Ship, Rail, Aircraft)
259 Other Manufacturing (Jewellery, Toy, Sporting)
942 Machinery and Equipment Repair and Maintenance
9499 Other Repair and Maintenance n.e.c.

Employees
by State / Territory (2021, ABS Census)



Industry
Snapshot

87,748
Businesses
JUN 2023
46% Non-employing
47% 1-19 employees
6% 20-199 employees
0.5% 200+ employees

730K
Persons employed
NOV 2023

5.2%
of employment all industries
NOV 2023

$95.1 Billion
Industry Value Add
2022 FY

+16.8%
Projected employment growth
TO 2033

Employee
Demographics

47%
27%
Female workers

30%
15%
Part-time workers

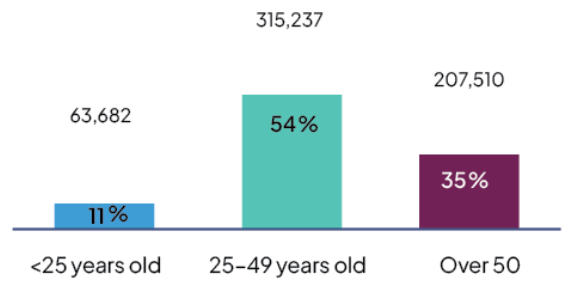
13%
10%
Work for a small business <20 people

31%
32%
Usual residence is in a non-greater capital city

% All industries

2%
1.5%
First Nations Workers

Employees
by age (2021, ABS Census)



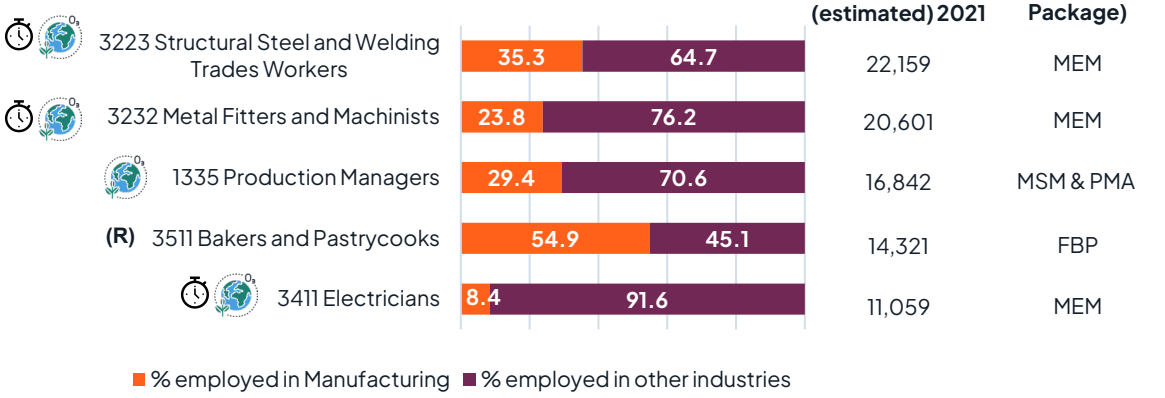
Manufacturing Industry Skills Alliance

Sources: ABS Labour Force, Detailed, November 2023, four-quarter averages (female & part-time employment, ANZSIC coverage); ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 excl. ANZSIC 942 & 9499 due to unavailability of data (IVA); ABS, Census 2021 (manufacturing workers by age, first nations status, work for a small business & usual residence), by ANZSIC coverage). Projections produced by Victoria University for Jobs and Skills Australia 2023-2033

All Manufacturing across the Manufacturing Alliance remit

Preliminary estimated shortage driver:
(R) Retention gap | Long training gap | Clean energy critical occupation

Top 5 priority 4-digit ANZSCO occupation groups[1]
(by highest employment number), % employed in Manufacturing



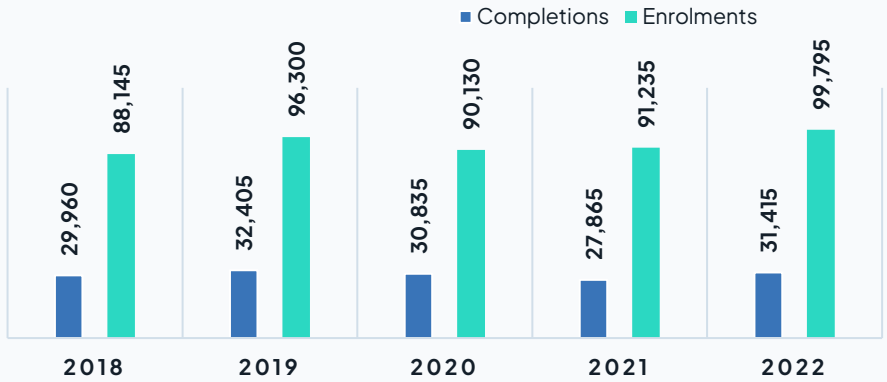
	Total no. employed in Manufacturing (estimated) 2021	Related training available (Training Package)
3223 Structural Steel and Welding Trades Workers	22,159	MEM
3232 Metal Fitters and Machinists	20,601	MEM
1335 Production Managers	16,842	MSM & PMA
(R) 3511 Bakers and Pastrycooks	14,321	FBP
3411 Electricians	11,059	MEM

MANUFACTURING QUALIFICATION ENROLMENTS & COMPLETIONS TRENDS

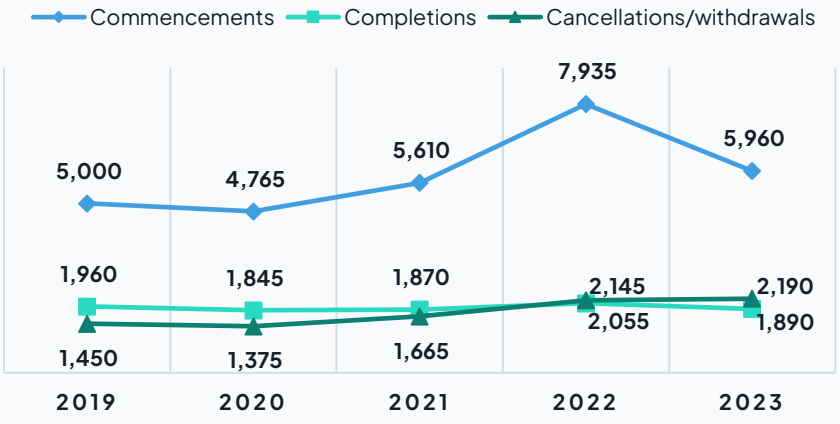
In 2022, there were

99,795 qualification enrolments
▲**13%** since 2018

31,415 qualification completions
▲**5%** since 2018



MANUFACTURING APPRENTICE/TRAINEE TRENDS



20%
FEMALE STUDENTS 2022

13%
STUDENTS SPEAK A LOTE AT HOME 2022

6%
STUDENTS HAVE A DISABILITY 2022

42%
of manufacturing qualification enrolments in 2022 were apprentices/trainees

84%
of students were **satisfied with training in 2022**[2]

1,151 RTOs are explicitly authorised to deliver Manufacturing training in 2024[2]

Training Package	Estimate (%)
Aeroskills (MEA)	84.1
Chemical, Hydrocarbons and Refining (PMA)	89.1
Food, Beverage and Pharmaceutical (FBP, FDF, SUG)	89.7
Laboratory Operations (MSL, PML)	88.8
Manufacturing (MCM, MSA, MSM)	88
Metal and Engineering (MEM)	91
Plastics, Rubber and Cablemaking (PMB)	86.2*
Printing and Graphic Arts (ICP)	91.9
Sustainability (MSS)	86.5

** the estimate has a margin of error greater than or equal to 10% and therefore should be used with caution*

Manufacturing Industry Skills Alliance

Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. JSA, 2023 Skills Priority List – priority occupation groups = several 6-digit occupations within this group have a national, state/territory or region-specific shortage; 2. training.gov.au – current RTOs authorized to deliver training (with manufacturing training package components on scope) as of 5/3/2024

Food & Beverage Sub-Sector

COVERAGE: ANZSIC Industry Classifications

12 Beverage and Tobacco Product Manufacturing

11 Food Product Manufacturing ***excl.*** *111 Meat and Meat Product Manufacturing and 112 Seafood Processing*

Industry Snapshot

13.9K
Businesses
JUN 2023

39%	Non-employing
49%	1-19 employees
11%	20-199 employees
1%	200+ employees

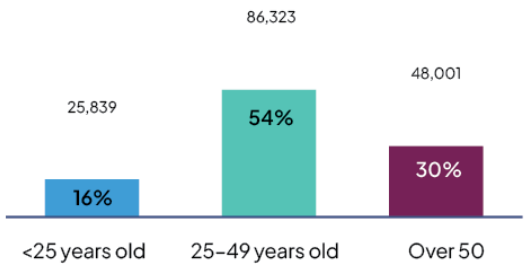
198.1K
Persons employed
NOV 2023

27%
of manufacturing employment
NOV 2023

$21.4 Billion
Industry Value Add
2022 FY

+11%
Projected employment growth
TO 2033

Employees by age (2021, ABS Census)



Employee Demographics

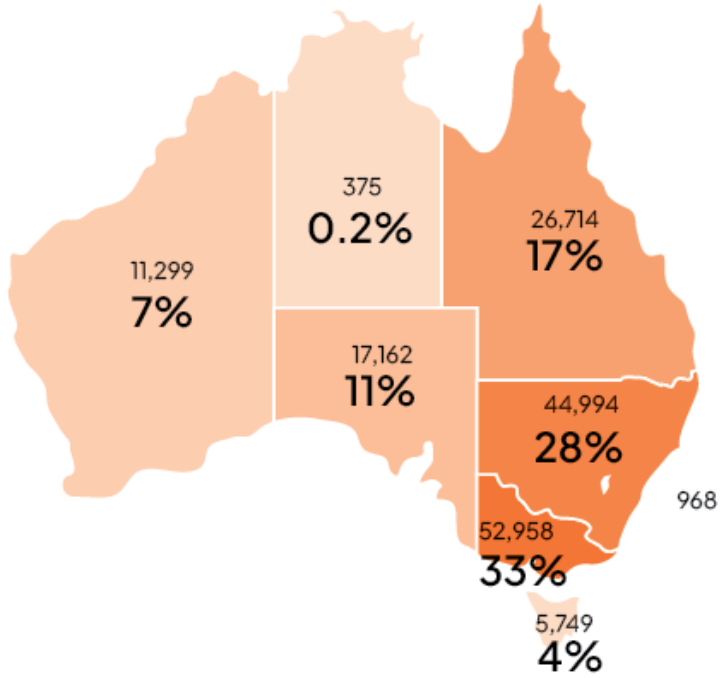
43% Female workers

27% Part-time workers

7% Work for a small business <20 people

37% Usual residence is in a non-greater capital city

Employees by State / Territory (2021, ABS Census)



Manufacturing Industry Skills Alliance

Sources: ABS, Labour Force Australia Detailed Nov 2023 - Table EQ06 by ANZSIC coverage (employment)
ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 (IVA); ABS, Census 2021 (manufacturing workers by residence, age, employer size) by ANZSIC coverage). Projections produced by Victoria University for Jobs and Skills Australia 2023-2033

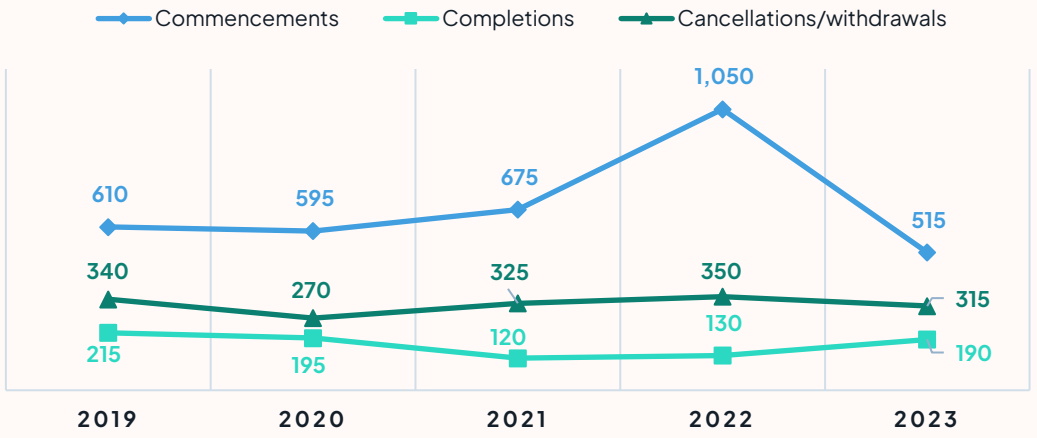
Food & Beverage Sub-Sector

Preliminary estimated shortage driver:
(R) Retention gap
Long training gap
Clean energy critical occupation

Qualifications from the FBP training package provides training for most occupations in this subsector.

Priority 4-digit ANZSCO occupation groups[1] (by highest employment number), % employed in Manufacturing	Total no. employed in Manufacturing (estimated) 2021	No. of related training available (FBP qualification/s)
(R) 3511 Bakers and Pastrycooks	14,321	4
2342 Chemists, and Food and Wine Scientists	3,285	2

FBP (FOOD/BEV) APPRENTICE AND TRAINEE TRENDS

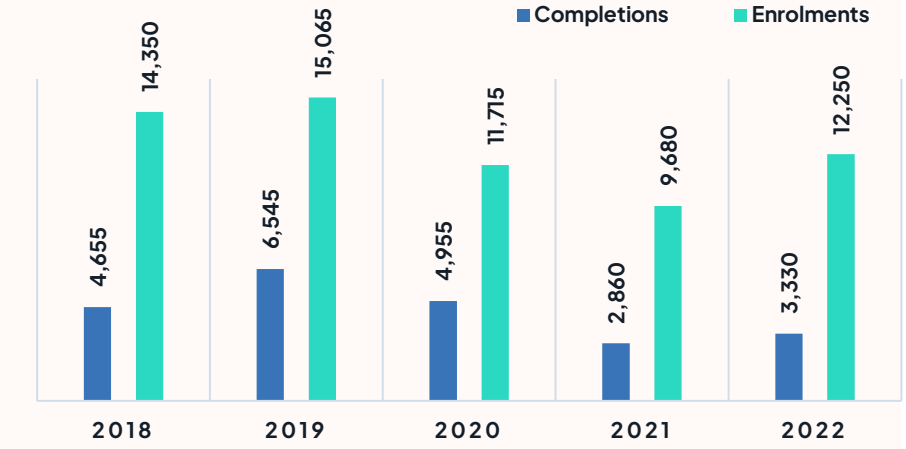


FBP (FOOD/BEV) QUALIFICATIONS ENROLMENTS & COMPLETIONS TRENDS

In 2022, there were

12,250 qualification enrolments
▼**15%** since 2018

3,330 qualification completions
▼**28%** since 2018



40%	18%	12%	4%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

53%
of FBP (food/bev) qualification enrolments **in 2022 were apprentices/trainees**

89.7%
of Food, Beverage and Pharmaceutical (FBP) students were **satisfied with training in 2022**[2]

103 RTOs are explicitly authorised to deliver FBP training in 2024[3]

Manufacturing Industry Skills Alliance

Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. JSA, 2023 Skills Priority List – priority occupation groups = several 6-digit occupations within this group have a national, state/territory or region-specific shortage; 2. Student satisfaction only available at TP level and could not be obtained for food/bev-specific qualifications only; 3. training.gov.au – current RTOs authorised to deliver training (with FBP training package components on scope) as of 5/3/2024

Food & Beverage Sub-Sector: Data Insights

Bakers and Pastrycooks have been identified in national shortage

Job vacancies in this group have grown since 2020 and spiked during 2022.

+ 11%

Projected Employment Growth to 2033

Workforce Challenge
ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

- Qualification **completions down 28%** in 2022 from 2018
- Qualification **enrolments down 15%** in 2022 from 2018

Where there are national shortages, JSA has identified retention gaps as a preliminary estimated shortage gap driver

Workforce Challenge
LACK OF DIVERSITY

Training enrolments reflect low numbers of People with Disabilities, People who speak a Language Other Than English and First Nation Students

Workforce Challenge
AGEING WORKFORCE

30% > 50 years old

16% < 25 years old

Workforce Challenge
EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

Clean energy critical occupation

Chemists and Food and Wine Scientists have been identified as clean energy critical occupations

Other data, research and industry consultation to be undertaken for future workforce plans

Manufacturing Industry Skills Alliance

Source: *Summary of data insights from slides 5-6*

Food & Beverage: Industry Themes

Four themes emerged from consultation with Food and Beverage industry participants:

1. Attraction and Retention Strategies	There's a clear focus on attracting and retaining talent in the industry, particularly through addressing perceptions, adapting to changing demographics like Gen Z, and offering part-time apprenticeships to accommodate diverse workforce needs.
2. Skills Development and Training	The need for consistent, accredited training programs was highlighted, along with the importance of practical, hands-on experience in the workplace. There was also an emphasis on offering varied modes of training to suit individual needs and encouraging continuous skill development.
3. Industry Sustainability and Innovation	Participants are keen on promoting sustainability practices within the industry, updating marketing strategies to appeal to newer generations, and exploring global opportunities for training and work experiences.
4. Regional Development and Accessibility	The importance of providing training opportunities and pathways for skill development in regional areas without requiring individuals to relocate was emphasised. Additionally, participants expressed a concern about the limited skilled visa sponsorship options and the inconsistency of training between providers nationally.

Manufacturing Industry Skills Alliance

***Source**: Summary of themes that emerged from industry stakeholder engagement*

Print and Graphic Arts sub-sector

COVERAGE: ANZSIC Industry Classifications

16 Printing (including the Reproduction of Recorded Media)

Industry Snapshot

5.3K
Businesses
JUN 2023

47%	Non-employing
49%	1-19 employees
4%	20-199 employees
0%	200+ employees

24.6K
Persons employed
NOV 2023

3%
of manufacturing employment
NOV 2023

$2.5 Billion
Industry Value Add
2022 FY

+6%
Projected employment growth
TO 2033

Employee Demographics

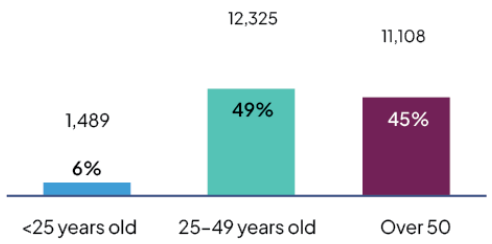
38% Female workers

19% Part-time workers

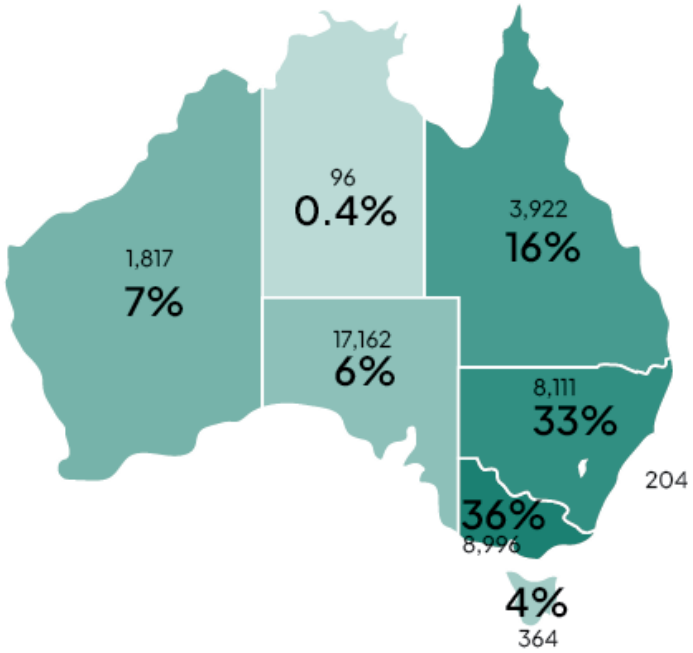
19% Work for a small business <20 people

17% Usual residence is in a non-greater capital city

Employees by age (2021, ABS Census)



Employees by State / Territory (2021, ABS Census)



Manufacturing Industry Skills Alliance

Sources: ABS, Labour Force Australia Detailed Nov 2023 - Table EQ06 by ANZSIC coverage (employment); ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 (IVA); ABS, Census 2021 (manufacturing workers by residence, age, employer size) by ANZSIC coverage); Projections produced by Victoria University for Jobs and Skills Australia 2023-2033

Print and Graphic Arts sub-sector

Preliminary estimated shortage driver:

(R) Retention gap

Long training gap

Clean energy critical occupation

Qualifications from the ICP training package provides training for most occupations in this subsector.

Priority 4-digit ANZSCO occupation groups[1] (by highest employment number), % employed in Manufacturing

			Total no. employed in Manufacturing (estimated) 2021	No. of related training available (ICP qualification/s)
3923 Printers	63.8	36.2	4,904	2
3921 Print Finishers and Screen Printers	69.9	30.1	1,687	1
3922 Graphic Pre-press Trades Workers	42.3	57.7	622	1

% employed in Manufacturing % employed in other industries

ICP QUALIFICATION ENROLMENTS & COMPLETIONS TRENDS

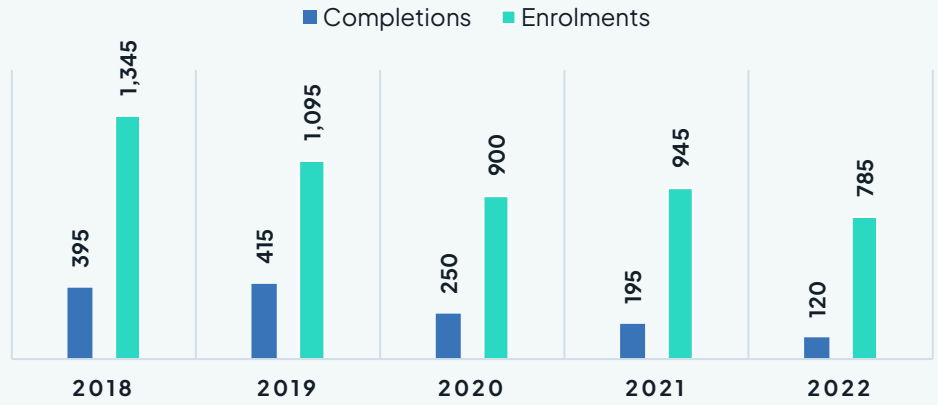
In 2022, there were

785 qualification enrolments

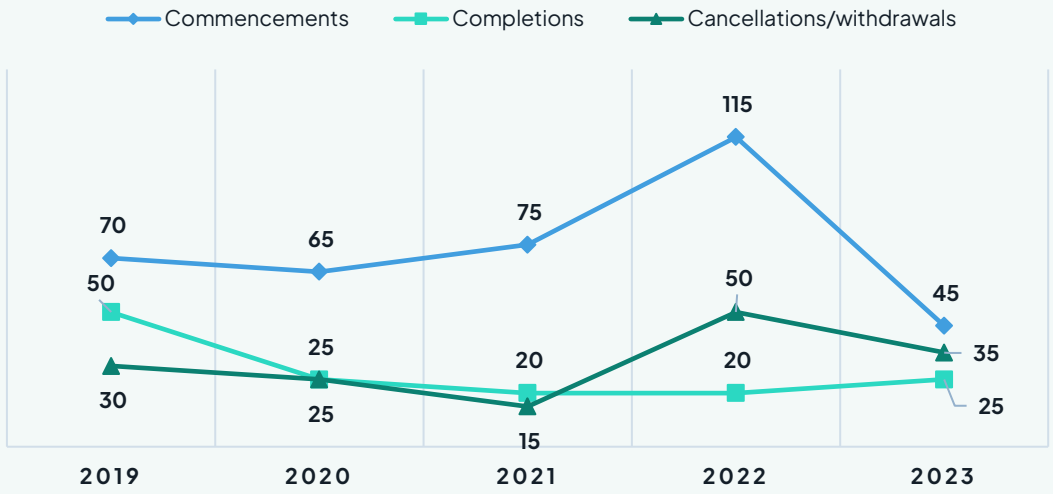
▼**42%** since 2018

120 qualification completions

▼**70%** since 2018



ICP APPRENTICE AND TRAINEE TRENDS (MARCH QUARTER)



20 RTOs are explicitly authorised to deliver ICP training in 2024[2]

36%	15%	6%	3%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

88%

of ICP qualification enrolments **in 2022 were apprentices/trainees**

91.9%

of Printing and Graphic Arts (ICP) students were **satisfied with training in 2022**[2]

Manufacturing Industry Skills Alliance

Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. JSA, 2023 Skills Priority List – priority occupation groups = several 6-digit occupations within this group have a national, state/territory or region-specific shortage; 2. training.gov.au – current RTOs authorized to deliver training (with ICP training package components on scope) as of 5/3/2024

Print and Graphic Arts: Data insights

+ 6%

Projected Employment Growth to 2033

Workforce Challenge
ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

- Qualification **completions down 70%** in 2022 from 2018
- Qualification **enrolments down 42%** in 2022 from 2018

Workforce Challenge
AGEING WORKFORCE

45% > 50 years old

6% < 25 years old

Workforce Challenge
LACK OF DIVERSITY

Training enrolments reflect low numbers of People with Disabilities, People who speak a Language Other Than English and First Nation Students

38% female workers

Workforce Challenge
EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

No immediate findings from this snapshot data – other data, research and industry consultation to be undertaken for future workforce plans

Manufacturing Industry Skills Alliance

Source: *Summary of data insights from slides 9-10*

Print and Graphic Arts: Industry Themes

Two themes emerged from consultation with Print and Graphic Arts industry participants:

1.	**Demographics and Career Paths**	Industry participants emphasise that many enter the print and graphic arts industry later in life, possibly attracted by the potential for self-employment. Additionally, the prevalence of women in certain roles, such as graphic design, compared to traditional printing roles, is highlighted.
2.	**Technology and Innovation**	There is increasing sophistication of printers and systems within the industry, raising the question of whether print should be classified as part of advanced manufacturing. Industry participants highlight the industry's adaptation to technological advancements and its ongoing evolution towards more advanced processes.

Manufacturing Industry Skills Alliance

***Source**: Summary of themes that emerged from industry stakeholder engagement*

Chemicals, Hydrocarbons & Refining

COVERAGE: ANZSIC Industry Classifications

- 17 Petroleum and Coal Product Manufacturing
- 18 Basic Chemical and Chemical Product Manufacturing *excl. Basic Polymer Manufacturing & Pharmaceutical and Medicinal Product Manufacturing*
- 21 Primary Metal and Metal Product Manufacturing *excl Steel Pipe and Tube Manufacturing & Basic Non-Ferrous Metal Product Manufacturing*

Industry Snapshot

4.2K
Businesses
JUNE 2023

49%	Non-employing
41%	1-19 employees
8%	20-199 employees
1%	200+ employees

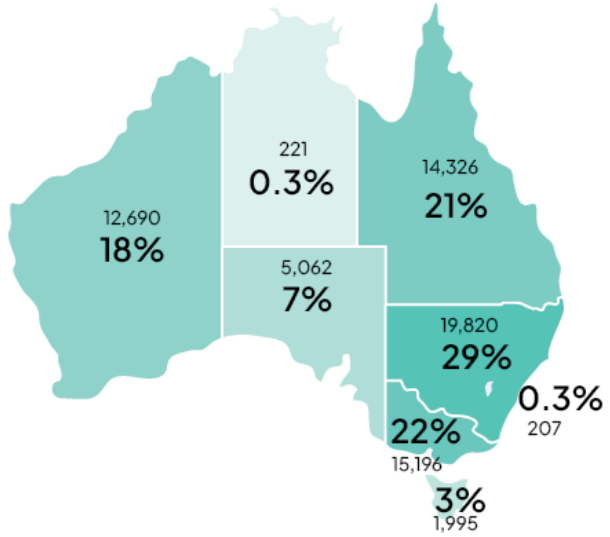
93.2K
Persons employed
NOV 2023

13%
of manufacturing employment
NOV 2023

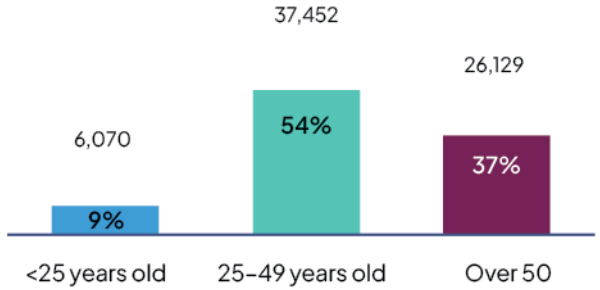
$20 Billion
Industry Value Add
2022 FY

+26%
Projected employment growth
TO 2033

Employees by State / Territory (2021, ABS Census)



Employees by age (2021, ABS Census)



Employee Demographics

20%
Female workers

8%
Part-time workers

8%
Work for a small business <20 people

43%
Usual residence is in a non-greater capital city

Manufacturing Industry Skills Alliance

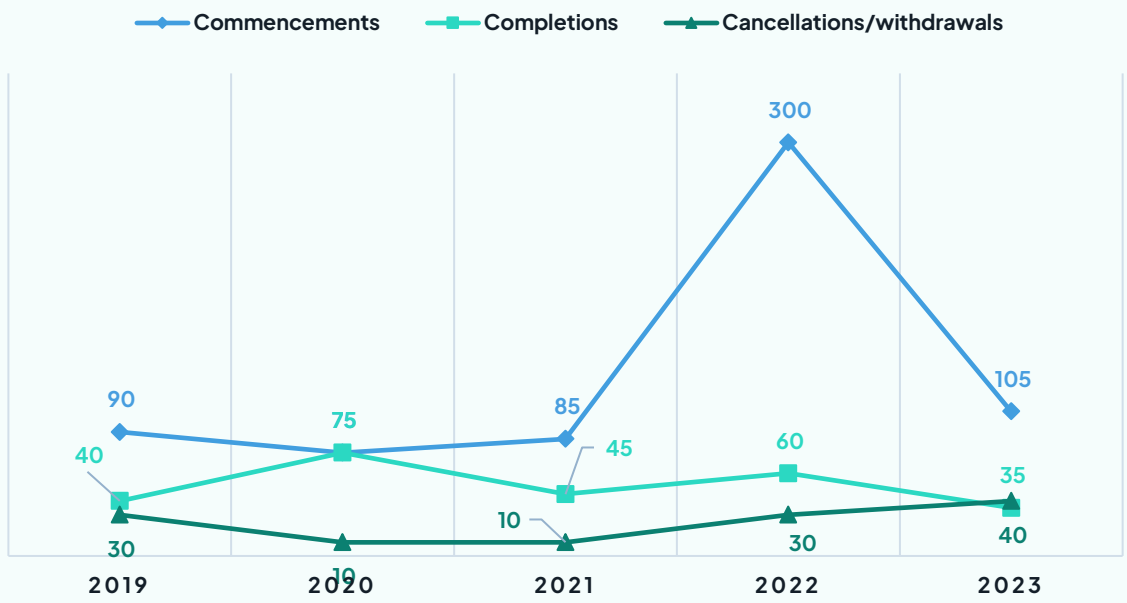
Sources: ABS, Labour Force Australia Detailed Nov 2023 - Table EQ06 by ANZSIC coverage (employment). Projections produced by Victoria University for Jobs and Skills Australia 2023-2033
ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 (IVA); ABS, Census 2021 (manufacturing workers by residence, age, employer size) by ANZSIC coverage).

Chemicals, Hydrocarbons & Refining

Qualifications from the PMA training package provides training for most occupations in this subsector.

Occupations primarily employed in this subsector (e.g. 399211 Chemical Plant Operator) has not been identified as an occupation in shortage on the 2023 Skills Priority List.

PMA APPRENTICE AND TRAINEE TRENDS (MARCH QUARTER)



PMA QUALIFICATION ENROLMENTS & COMPLETIONS TRENDS

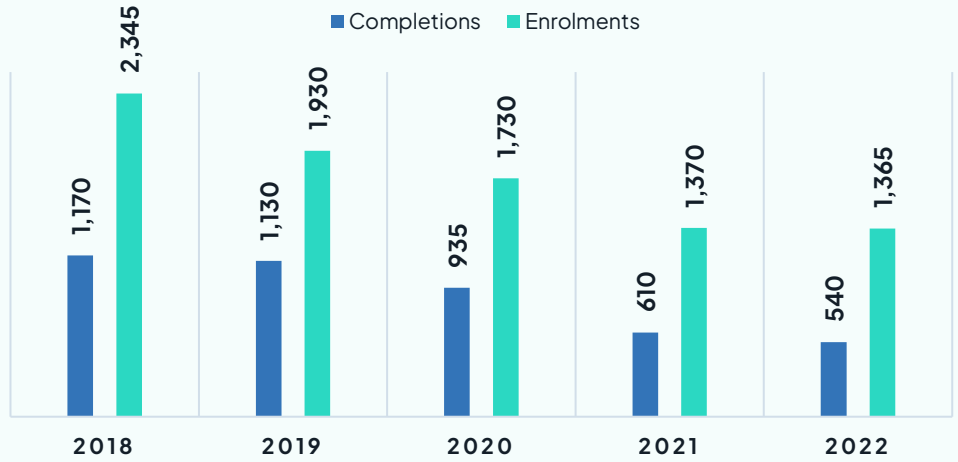
In 2022, there were

1,365 qualification enrolments

▼**42%** since 2018

540 qualification completions

▼**54%** since 2018



108 RTOs are explicitly authorised to deliver ICP training in 2024[2]

26%	12%	1%	5%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

49%

of **PMA** qualification enrolments in 2022 were apprentices/trainees

89.1%

of Chemical, Hydrocarbons and Refining (PMA) students **were satisfied with training in 2022**

Manufacturing Industry Skills Alliance

Sources: NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. training.gov.au – current RTOs authorized to deliver training (with PMA training package components on scope) as of 5/3/2024

Chemicals, Hydrocarbons & Refining: Data Insights

+ 26%

Projected Employment Growth to 2033

Workforce Challenge
ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

- Qualification **enrolments down 42%** in 2022 from 2018
- Qualification **completions down 54%** in 2022 from 2018

Workforce Challenge
AGEING WORKFORCE

37.5% > 50 years old

8.7% < 25 years old

Workforce Challenge
LACK OF DIVERSITY

Training enrolments reflect low numbers of People with Disabilities, People who speak a Language Other Than English and First Nation Students

20% female workers

Workforce Challenge
EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

No immediate findings from this snapshot data – other data, research and industry consultation to be undertaken for future workforce plans

Manufacturing Industry Skills Alliance

Source: *Summary of data insights from slides 13-14*

Chemicals, Hydrocarbons & Refining: Industry Themes

Energy security is an issue concerning all countries. Australia is well-positioned to capitalise on this situation and be a global leader in exporting renewable energy in forms such as green hydrogen or electricity via undersea cables. Expanding Australian industry's capacity further along battery mineral value chains is also possible, through businesses building capabilities in downstream refining, manufacturing, and battery integration and services. There is also further work to be done to explore possibilities for Australia to shift existing manufacturing to low emissions technologies (Treasury Department, 2023, p. 20).

Domestically, the Australian clean energy sector is preparing for a period of extraordinary growth and development as Australia accelerates towards a fully clean domestic energy power system. Australia is reshaping its energy industry to reduce emissions, cut power costs and set itself up for net zero energy by 2050 (Jobs and Skills Australia, 2023, p. 77). Australia's geography provides an opportunity to reduce carbon emissions from energy-intensive industries like metal refining. The country has low population density, light vegetation, sunny climate, and flat topography which makes it ideal for large-scale solar and wind energy generation. This could be a significant advantage in a world where investors are increasingly focused on ESG considerations, particularly climate change (House of Representatives, 2023, p. 19). A significant growth in the clean energy workforce is required to deliver these projects in a sustainable, safe and efficient way (Clean Energy Council, 2022, p. 3).

Three other themes emerged from consultation with Chemicals, Hydrocarbons and Refining industry participants:

1. Workforce Development and Perception	There is a need to address perceptions around manufacturing, particularly among middle-class individuals, to attract a broader pool of talent. Additionally, there's a focus on upskilling and pre-employment programmes to enhance the readiness of potential employees and increase the viability of the workforce.
2. Training and Education	There's a call for a broader, transferrable approach to problem-solving in training programmes, emphasising fundamental skills over specialisation. The importance of ongoing training and education for the incumbent workforce is highlighted, along with the need for improved attitudes toward competency development.
3. Regional Challenges and Infrastructure	Issues related to housing availability in regional areas, such as Townsville, are identified as barriers to attracting and retaining staff. Furthermore, changes in the work ethic of incoming generations are noted, suggesting a shift from a traditional work-for-a-living mentality to a more individualistic perspective.

Manufacturing Industry Skills Alliance

***Source**: Summary of themes that emerged from industry stakeholder engagement*

Pharmaceutical Manufacturing

COVERAGE: ANZSIC Industry Classifications
184 Pharmaceutical and Medicinal Product Manufacturing

Industry Snapshot

666
Businesses
JUNE 2023

50%	Non-employing
35%	1-19 employees
12%	20-199 employees
3%	200+ employees

34.7K
Persons employed
NOV 2023

5%
of manufacturing employment
NOV 2023

$3.4 Billion
Industry Value Add
2022 FY

+35%
Projected employment growth
TO 2033

Employee Demographics

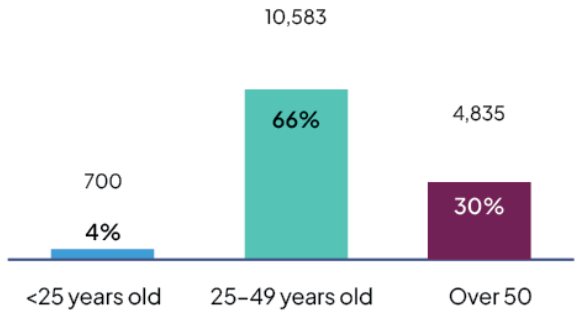
44% Female workers

19% Part-time workers

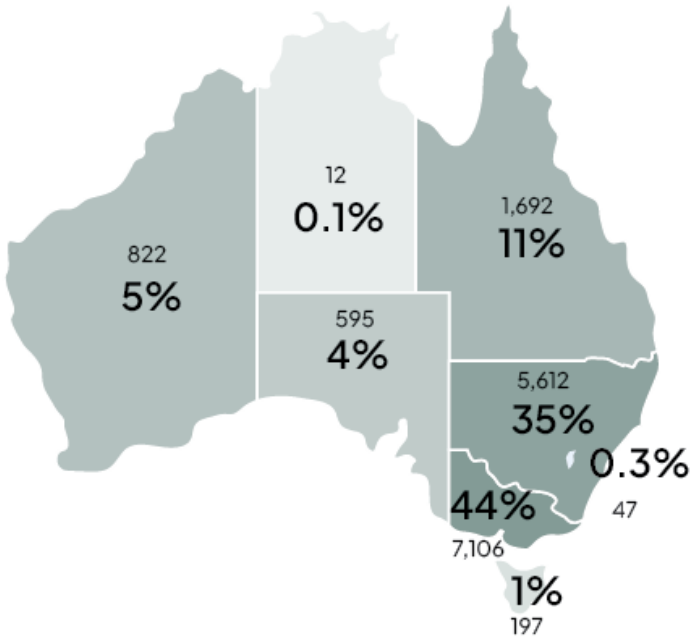
10% Work for a small business <20 people

9% Usual residence is in a non-greater capital city

Employees by age (2021, ABS Census)



Employees by State / Territory (2021, ABS Census)



Manufacturing Industry Skills Alliance

Sources: ABS, Labour Force Australia Detailed Nov 2023 - Table EQ06 by ANZSIC coverage (employment); Projections produced by Victoria University for Jobs and Skills Australia 2023-2033; ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 (IVA); ABS, Census 2021 (manufacturing workers by residence, age, employer size) by ANZSIC coverage;

Pharmaceutical Manufacturing

Select qualifications from the FBP training package provides training for most occupations in this subsector.

Occupations primarily employed in this subsector (e.g. 399211 Chemical Plant Operator or 711911 Chemical Production Machine Operator) has not been identified as an occupation in shortage on the 2023 Skills Priority List.

In 2022, there were

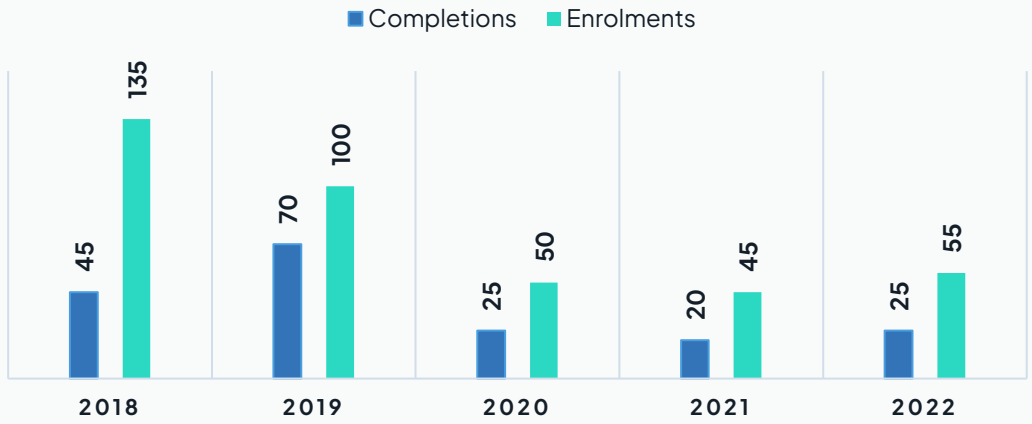
55 qualification enrolments

▼**59%** since 2018

25 qualification completions

▼**44%** since 2018

FBP (PHARMA) QUALIFICATION ENROLMENTS & COMPLETIONS TRENDS



0%

of **FBP (pharma)** qualification enrolments in 2022 were apprentices/trainees

89.7%

of Food, Beverage and Pharmaceutical (FBP)* students were satisfied with training in 2022[1]

2 RTOs are explicitly authorised to deliver Pharma (FBP) training in 2024[2]

73%	45%	0%	0%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

Manufacturing Industry Skills Alliance

Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. Student satisfaction only available at TP level and could not be obtained for pharma-specific qualifications only; 2. training.gov.au – current RTOs authorised to deliver training (with PMB training package components on scope) as of 5/3/2024

Pharmaceutical Manufacturing: Data Insights

+ 35%

Projected Employment Growth to 2033

Workforce Challenge
ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

- Qualification **enrolments down 59%** in 2022 from 2018
- Qualification **completions down 44%** in 2022 from 2018

Workforce Challenge
AGEING WORKFORCE

30% > 50 years old

4.3% < 25 years old

No immediate findings from this snapshot data – other data, research and industry consultation TBA

Workforce Challenge
LACK OF DIVERSITY

Training enrolments: **73%** female, **44%** LOTE, but 0 People with Disability and 0 First Nation Students

44% female workers

Workforce Challenge
EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

No immediate findings from this snapshot data – other data, research and industry consultation to be undertaken for future workforce plans

Manufacturing Industry Skills Alliance

Source: *Summary of data insights from slides 17-18*

Pharmaceutical Manufacturing: Industry Themes

Three other themes emerged from consultation with Pharmaceutical Manufacturing industry participants:

1. Digital Skills Integration	There's concern about the lack of digital skills affecting productivity and growth in manufacturing. The importance of incorporating digital skills into discussions on foundational skills is emphasised for future progress.
2. Workforce Development and Diversity	Efforts are underway to make manufacturing more appealing as a career option, including increasing visibility of opportunities in schools and enhancing knowledge transfer through traineeships. Additionally, initiatives aim to increase participation from underrepresented groups, such as migrants and women, by providing practical training and recognising transferable skills.
3. Adaptation of Training Methods	There's recognition of the need to adapt training methods to meet emerging industry demands. While TAFE training is acknowledged, there's a call for more agile approaches to training that can better align with evolving industry needs. Additionally, there's a push to enhance access and quality of training across sectors, with a focus on areas like Medical Science Laboratory (MSL) skills beyond just aggrotech.

Manufacturing Industry Skills Alliance

***Source**: Summary of themes that emerged from industry stakeholder engagement*

Plastics, Rubber & Cable-Making

COVERAGE: ANZSIC Industry Classifications

19 Polymer Product and Rubber Product Manufacturing

182 Basic Polymer Manufacturing
2431 Electric Cable and Wire Manufacturing

Industry Snapshot

3.5K
Businesses
JUNE 2023

40%	Non-employing
47%	1–19 employees
13%	20–199 employees
1%	200+ employees

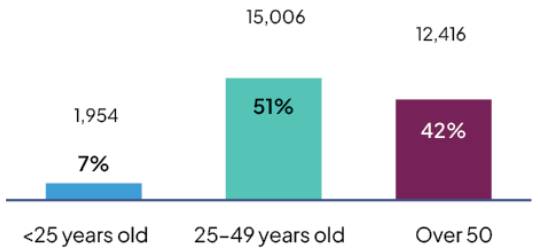
28.2K
Persons employed
NOV 2023

4%
of manufacturing employment
NOV 2023

$6.3 Billion
Industry Value Add
2022 FY

+19%
Projected employment growth
TO 2033

Employees by age (2021, ABS Census)



Employee Demographics

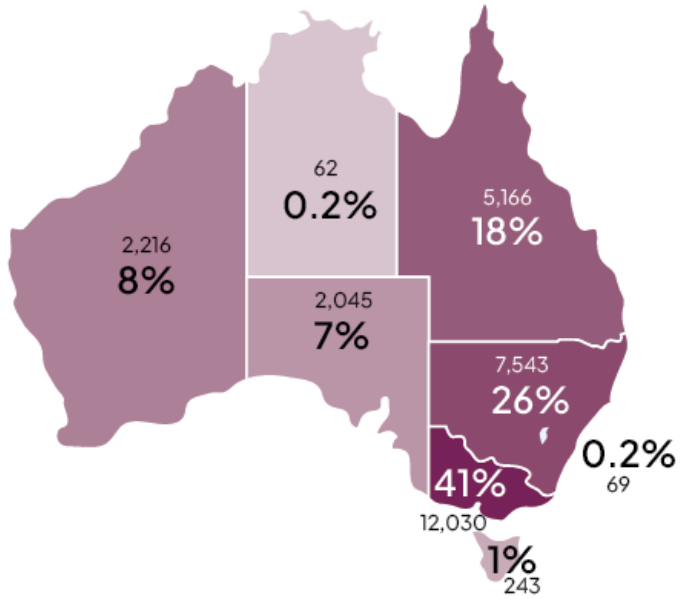
25%
Female workers

8%
Part-time workers

5%
Work for a small business <20 people

17%
Usual residence is in a non-greater capital city

Employees by State / Territory (2021, ABS Census)



Manufacturing Industry Skills Alliance

Sources: ABS, Labour Force Australia Detailed Nov 2023 - Table EQ06 by ANZSIC coverage (employment); ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 (IVA); ABS, Census 2021 (manufacturing workers by residence, age, employer size) by ANZSIC coverage).
Note: 1. Projections produced by Victoria University for Jobs and Skills Australia 2023-2033. Data only available at 3-digit ANZSIC, as such, all statistics under ANZSIC 243 have been grouped under General Manufacturing & Engineering.

Plastics, Rubber & Cable-Making

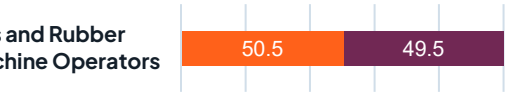
Preliminary estimated shortage driver:

(R) Retention gap Long training gap

Clean energy critical occupation

Qualifications from the PMB training package provides training for most occupations in this subsector.

Priority 4-digit ANZSCO occupation groups[1] (by highest employment number), % employed in Manufacturing	Total no. employed in Manufacturing (estimated) 2021	No. of related training available (PMB qualification/s)
(R) 7115 Plastics and Rubber Production Machine Operators	3,225	2



% employed in Manufacturing

% employed in other industries

In 2022, there were

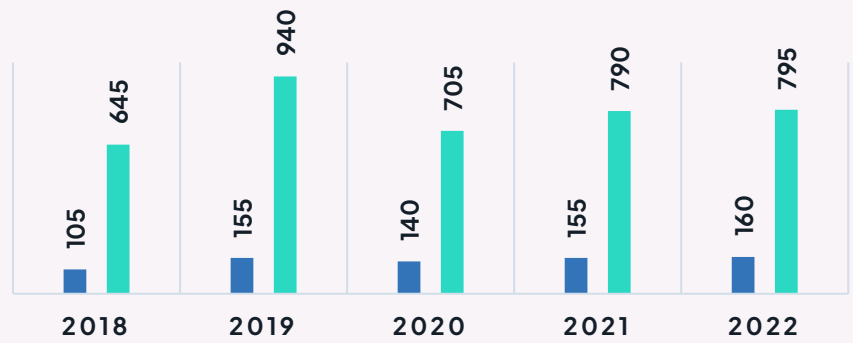
795 qualification enrolments

▲**23%** since 2018

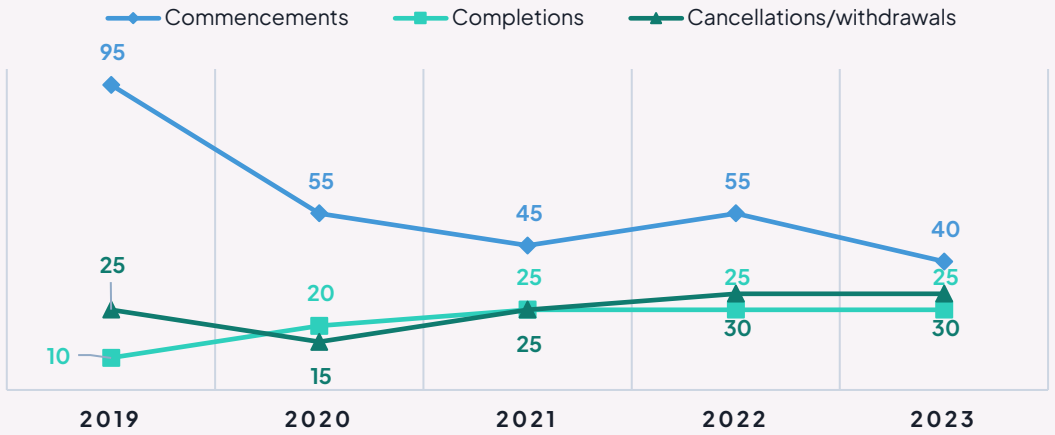
160 qualification completions

▲**52%** since 2018

PMB QUALIFICATION ENROLMENTS & COMPLETIONS TRENDS



PMB APPRENTICE AND TRAINEE TRENDS (MARCH QUARTER)



8%	6%	6%	5%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

86.2%*

Plastics, Rubber and Cable-making (PMB)*students were **satisfied with training in 2022**

An asterix (*) indicates the estimate has a margin of error greater than or equal to 10% and therefore should be used with caution

55%

of **PMB** qualification enrolments in 2022 were apprentices/trainees

33 RTOs are explicitly authorised to deliver PMB) training in 2024[2]

Manufacturing Industry Skills Alliance

Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. JSA, 2023 Skills Priority List – priority occupation groups = several 6-digit occupations within this group have a national, state/territory or region-specific shortage; 2. training.gov.au – current RTOs authorized to deliver training (with PMB training package components on scope) as of 5/3/2024

Plastics, Rubber & Cable-Making: Data Insights

+ 19%

Projected Employment Growth to 2033

Workforce Challenge
ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

Where there are national shortages, JSA have identified retention gaps as a preliminary estimated shortage gap driver

Workforce Challenge
AGEING WORKFORCE

42% > 50 years old

6.7% < 25 years old

Workforce Challenge
LACK OF DIVERSITY

Training enrolments reflect low number of People with Disabilities, People who speak a Language other than English and First Nation Students

25% female workers

Workforce Challenge
EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

No immediate findings from this snapshot data – other data, research and industry consultation to be undertaken for future workforce plans

Manufacturing Industry Skills Alliance

Source: *Summary of data insights from slides 21-22*

Plastics, Rubber & Cable-Making: Industry Themes

Four themes emerged from consultation with Plastics, Rubber and Cable-making industry participants:

1. Labour Shortages and Recruitment Challenges	Difficulty in finding both skilled and unskilled factory workers was highlighted, necessitating novel recruitment methods such as advertising on church noticeboards. Specific shortages in toolmaking and die-setting skills were also mentioned, with concerns about the availability of training programs.
2. Government Support and Grants	There's a desire for government incentives, grants, and subsidies to support both employees and equipment investment. However, there are challenges with the application process, especially for smaller companies, leading to calls for streamlining and pre-approval processes to make access easier.
3. Workload and Reshoring	Increased workload due to new customers and reshoring efforts, where customers prefer domestic production, are noted. However, workforce shortages threaten the ability to meet demand and deliver on orders.
4. Industry Awareness and Training Needs	There was recognition of an image problem in attracting job seekers to the industry, particularly in regions like Queensland where competition from mining and rail projects is fierce. Additionally, there's a need for higher-level skills training, such as metallurgist training focused on production rather than extractive work, and challenges in diversifying the workforce to meet global parent company requirements.

Manufacturing Industry Skills Alliance

***Source**: Summary of themes that emerged from industry stakeholder engagement*

Manufactured Mineral Products

COVERAGE: ANZSIC Industry Classifications

20 Non-Metallic Mineral Product Manufacturing *excl. 201 Glass and Glass Product Manufacturing*

Industry Snapshot

3.3K
Businesses
JUNE 2023

44%	Non-employing
48%	1–19 employees
7%	20–199 employees
1%	200+ employees

26.7K
Persons employed
NOV 2023

4%
of manufacturing employment
NOV 2023

$5.6 Billion
Industry Value Add
2022 FY

+13%
Projected employment growth
TO 2033

Employee Demographics

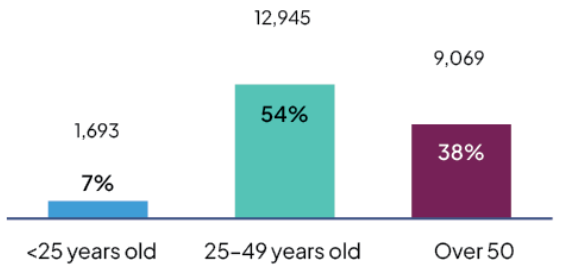
21% Female workers

16% Part-time workers

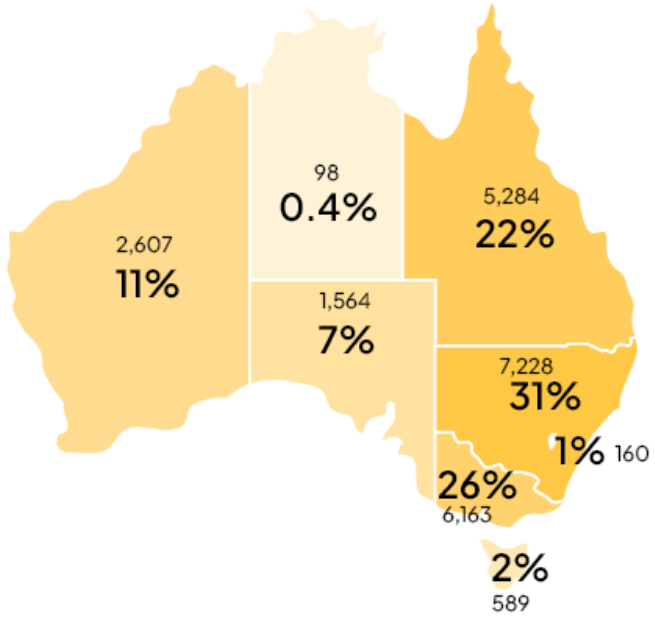
10% Work for a small business <20 people

33% Usual residence is in a non-greater capital city

Employees by age (2021, ABS Census)



Employees by State / Territory (2021, ABS Census)



Manufacturing Industry Skills Alliance

Sources: ABS, Labour Force Australia Detailed Nov 2023 - Table EQ06 by ANZSIC coverage (employment); ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 (IVA); ABS, Census 2021 (manufacturing workers by residence, age, employer size) by ANZSIC coverage); Projections produced by Victoria University for Jobs and Skills Australia 2023-2033

Manufactured Mineral Products

1 qualification (Certificate III in Manufactured Mineral Products) from the MSM training package provides training for most occupations in this subsector.

Occupation groups primarily employed in this subsector (e.g. 7111 Clay, Concrete, Glass and Stone Processing Machine Operators) have not been identified as in shortage on the 2023 Skills Priority List.

In 2022, there were

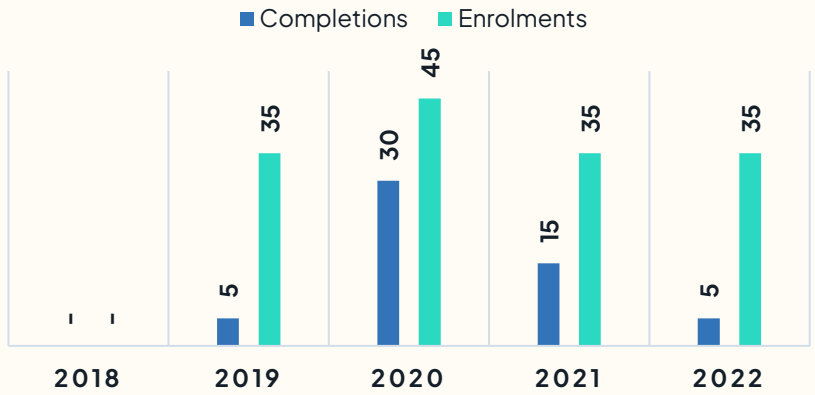
35 qualification enrolments

no change since 2019

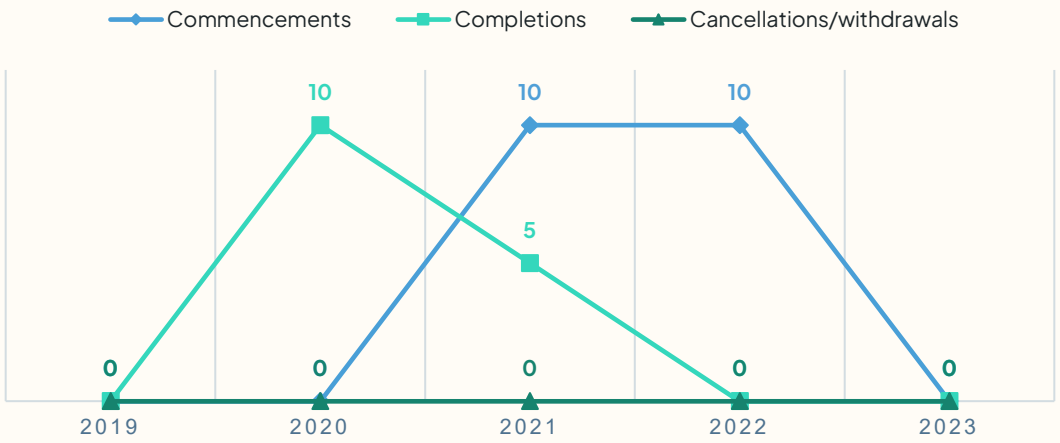
5 qualification completions

no change since 2019

CERT III IN MANUFACTURED MINERAL PRODUCTS ENROLMENTS & COMPLETIONS TRENDS



CERT III IN MANUFACTURED MINERAL PRODUCTS APPRENTICE AND TRAINEE TRENDS (MARCH QUARTER)



4 RTOs are explicitly authorised to deliver the Cert III in Manufactured Mineral Products in 2024

0%	0%	0%	0%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

86%

of **MSM** Cert III in Manufactured Mineral Products enrolments in 2022 were apprentices/trainees

88%

of Manufacturing (MCM, MSA, MSM) students **were satisfied with training in 2022**[1]

Manufacturing Industry Skills Alliance

Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. Student satisfaction only available at TP level and could not be obtained for mfg mineral product-specific qualifications only.

Manufactured Mineral Products: Data Insights

+ 13%

Projected Employment Growth to 2033

Workforce Challenge

ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

No immediate findings from this snapshot data – other data, research and industry consultation to be undertaken for future workforce plans

Workforce Challenge

AGEING WORKFORCE

38% > 50 years old

7% < 25 years old

Workforce Challenge

LACK OF DIVERSITY

Training enrolments reflect 0 Women, People with Disabilities, People who speak a Language other than English and First Nation Students

21% female workers

Workforce Challenge

EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

No immediate findings from this snapshot data – other data, research and industry consultation to be undertaken for future workforce plans

Manufacturing Industry Skills Alliance

Source: *Summary of data insights from slides 25-26*

Manufactured Mineral Products: Industry Themes

Three themes emerged from consultation with Manufactured Mineral Products industry participants:

1. Industry Engagement with Education	It is important to engage with schools and universities to expose students to manufacturing pathways. This includes initiatives like factory tours, hands-on experience, and collaboration on real-world problems, which can help attract and retain talent.
2. Challenges with Training Institutions	Comments made on the inflexibility of TAFEs in accommodating the needs of businesses, particularly in terms of apprentice training. Private Registered Training Organisations (RTOs), appear to offer greater flexibility.
3. Visibility and Perception of Manufacturing	Industry participants highlight the importance of visibility in attracting candidates to manufacturing careers. While some sectors, like utility tray fabrication, benefit from high visibility and attractiveness to trade-oriented individuals, others, such as component manufacturing, struggle to attract candidates due to a lack of visibility of the end product.

Manufacturing Industry Skills Alliance

***Source**: Summary of themes that emerged from industry stakeholder engagement*

Aerospace

COVERAGE: ANZSIC Industry Classifications

2394 Aircraft Manufacturing and Repair Services

Industry Snapshot

946
Businesses
JUNE 2023

51%	Non-employing
44%	1–19 employees
5%	20–199 employees
1%	200+ employees

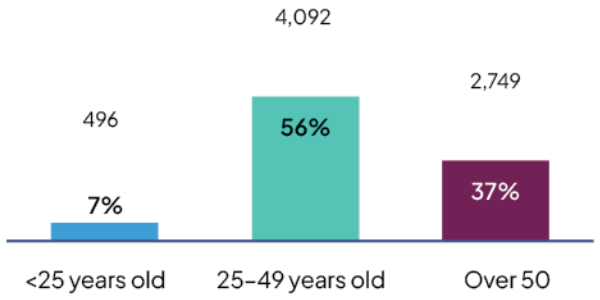
7.3K
Persons employed
NOV 2023

1%
of manufacturing employment
NOV 2023

$1.2 Billion
Industry Value Add
2022 FY

+14%
Projected employment growth
TO 2033

Employees by age (2021, ABS Census)



Employee Demographics

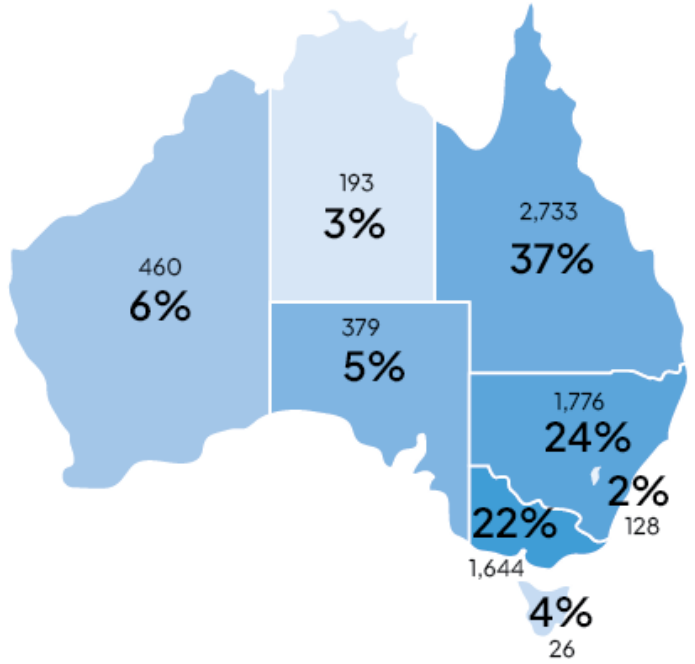
16%
Female workers

12%
Part-time workers

7%
Work for a small business <20 people

29%
Usual residence is in a non-greater capital city

Employees by State / Territory (2021, ABS Census)



Manufacturing Industry Skills Alliance

Sources: ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Australian Industry 2021-2022 (IVA); ABS, Census 2021 (manufacturing workers by gender, hours worked (part-time), residence, age, employer size by ANZSIC coverage).
Note: 1. Projections produced by Victoria University for Jobs and Skills Australia 2023-2033. Data only available at 3-digit ANZSIC, as such, employment projections for ANZSIC 239 have been used for Aerospace.

Aerospace

Preliminary estimated shortage driver:

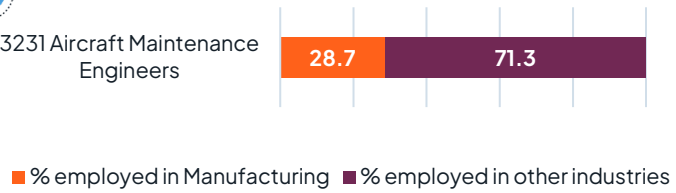
(R) Retention gap

Long training gap

Clean energy critical occupation

Qualifications from the MEA training package provides training for most occupations in this subsector.

Priority 4-digit ANZSCO occupation groups[1] (by highest employment number), % employed in Manufacturing	Total no. employed in Manufacturing (estimated) 2021	No. of related training available (MEA qualification/s)
3231 Aircraft Maintenance Engineers	3,295	18



MEA QUALIFICATION ENROLMENTS & COMPLETIONS TRENDS

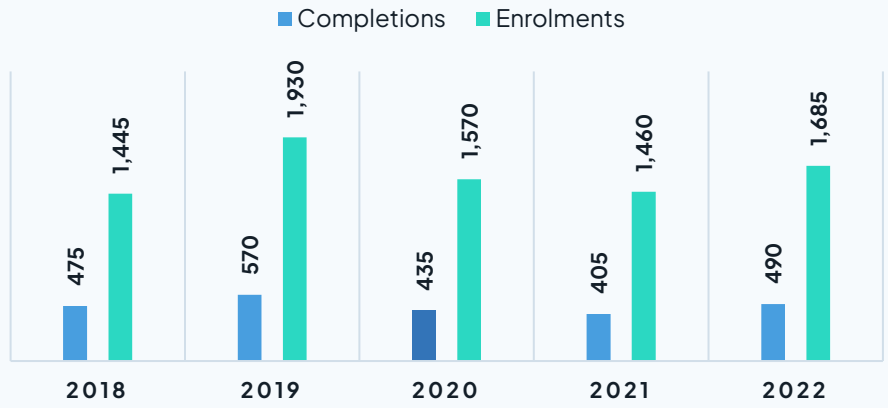
In 2022, there were

1,685 qualification enrolments

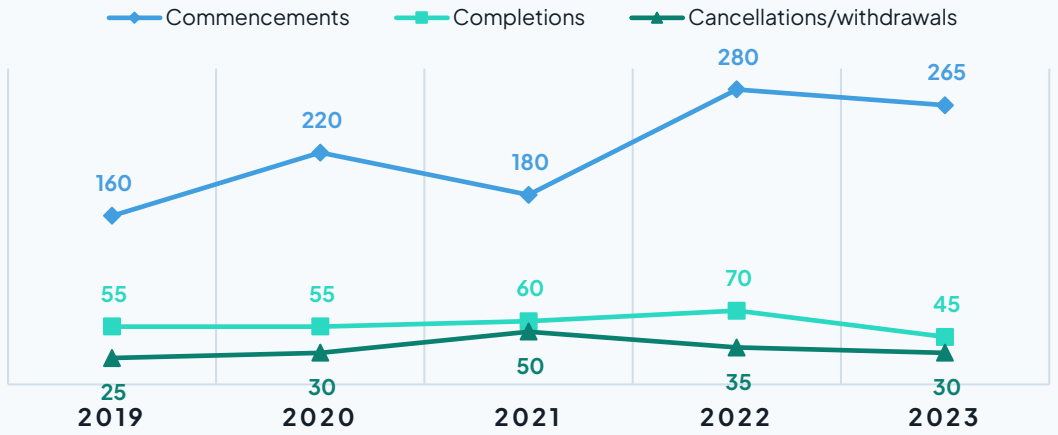
▲**17%** since 2018

490 qualification completions

▲**3%** since 2018



MEA APPRENTICE AND TRAINEE TRENDS (MARCH QUARTER)



10%	5%	3%	3%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

45%
of MEA qualification enrolments in 2022 were apprentices/trainees

84.1%
of Aeroskills (MEA) students were satisfied with training in 2022

13 RTOs are explicitly authorised to deliver MEA training in 2024[2]

Manufacturing Industry Skills Alliance

Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.

Note: 1. JSA, 2023 Skills Priority List – priority occupation groups = several 6-digit occupations within this group have a national, state/territory or region-specific shortage; 2. training.gov.au – current RTOs authorized to deliver training (with MEA training package components on scope) as of 5/3/2024

Aerospace: Data Insights

Projected Employment Growth to 2033 not available in current data set

Workforce Challenge
ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

No immediate findings from this snapshot data – other data, research and industry consultation to be undertaken for future workforce plans

Workforce Challenge
AGEING WORKFORCE

37% > 50 years old

6.7% < 25 years old

Workforce Challenge
LACK OF DIVERSITY

Training enrolments reflect lower numbers of Women, People with Disabilities, People who speak a Language other than English and First Nation Students

16% female workers

Workforce Challenge
EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

Aircraft Maintenance Engineers identified as green energy critical occupation

Manufacturing Industry Skills Alliance

Source: *Summary of data insights from slides 29-30*

Aerospace: Industry Themes

Three themes emerged from consultation with Aerospace industry participants:

1. Workforce Challenges in Aviation	The ageing workforce and the lack of a consistent pipeline of new talent entering the aviation industry are highlighted as ongoing concerns. Attraction and retention are key issues, exacerbated by a perception of aviation as a highly skilled environment that may deter potential candidates.
2. Skills Development and Training Reform	There's a recognition of the need for reform in the apprenticeship model, with suggestions that it is outdated and not fit for purpose in the modern context. Challenges include low completion rates due in part to inadequate mentoring and training from industry leaders. Additionally, there's a call for improved soft skills training to better support a diverse workforce.
3. Regulatory and Funding Challenges	The disjointed alignment between regulatory requirements from organisations like CASA and vocational education requirements impacts the efficiency and experience of the training process for aircraft engineers. Furthermore, there are challenges with accessing funding and grants for enhancing learning technologies and addressing literacy levels, compounded by confusion across different jurisdictions and a lack of clear career pathways in the industry.

The European experience is instructive. In Europe, the aerospace and defense industry, like many others, is in fierce competition for talent. It faces challenges in recruiting the best talent, particularly when competing with tech companies and startups that prioritise innovation. The European Commission has initiated a skills improvement program to address skills shortages and digital skills. Aerospace and defense companies are struggling to attract younger employees to a workforce dominated by older professionals nearing retirement. Demographic shifts and a willingness among employees to change jobs have lowered talent replacement rates, especially in Europe. Younger workers seek quick, clear processes, career progression, and prefer a hybrid workplace. Expanding talent pools, partnering with external parties, and cooperation with educational systems are essential. Recognising the desire of older adults to continue working and offering nonlinear career paths and mentoring can address employee needs. Leading aerospace and defense companies are adapting to these changes to secure future value creation, with European players facing particularly intense challenges and relying on collaboration with educational institutions and the public sector to attract younger talent. (McKinsey & Company, 2023)

Manufacturing Industry Skills Alliance

***Source**: Summary of themes that emerged from industry stakeholder engagement*

General Manufacturing & Engineering

COVERAGE: ANZSIC Industry Classifications

22 Fabricated Metal Product Manufacturing
2122 Steel Pipe and Tube Manufacturing
214 Basic Non-Ferrous Metal Product Manufacturing
24 Machinery and Equipment Manufacturing *excl. Electric Cable and Wire Manufacturing*
239 Other Transport Equipment Manufacturing *excl. Aircraft Manufacturing and Repair Services*
259 Other Manufacturing (Jewellery, Toy, Sporting)
942 Machinery and Equipment Repair and Maintenance
9499 Other Repair and Maintenance n.e.c.

Industry Snapshot

56K
Businesses
JUNE 2023
48% Non-employing
48% 1-19 employees
5% 20-199 employees
0% 200+ employees

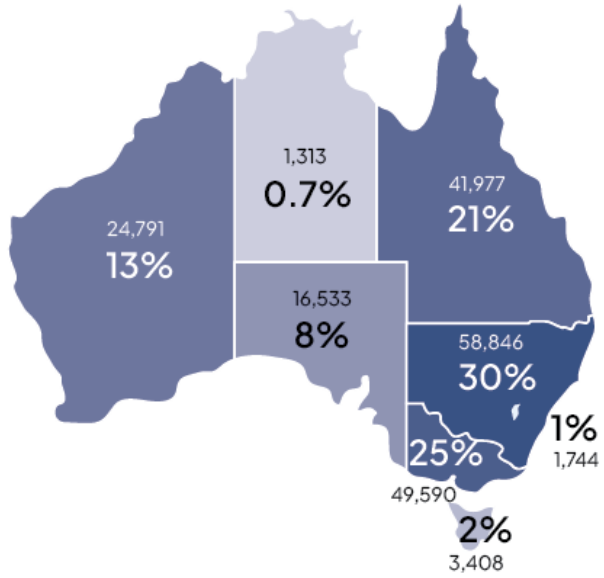
307.5K
Persons employed
NOV 2023

42%
of manufacturing employment
NOV 2023

$34.7 Billion
Industry Value Add
2022 FY

+17%
Projected employment growth
TO 2033

Employees by State / Territory (2021, ABS Census)



Employee Demographics

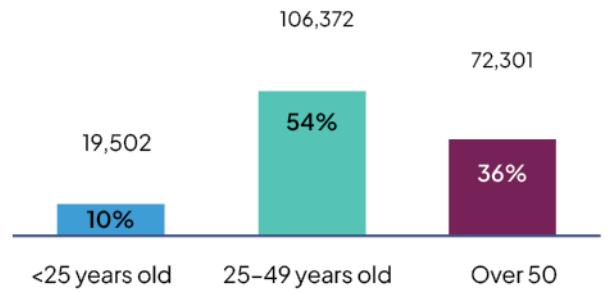
22% Female workers

16% Part-time workers

15% Work for a small business <20 people

29% Usual residence is in a non-greater capital city

Employees by age (2021, ABS Census)



Manufacturing Industry Skills Alliance

Sources: ABS, Labour Force Australia Detailed Nov 2023 - Table EQ06 by ANZSIC coverage (employment); ABS, Counts of Businesses June 2023 by ANZSIC coverage; ABS, Census 2021 (manufacturing workers by residence, age, employer size) by ANZSIC coverage).
*Note: 1. Projections produced by Victoria University for Jobs and Skills Australia 2023-2033. Data only available at 3-digit ANZSIC, as such, all statistics under ANZSIC 24 & 239 have been grouped under this subsector; 2. ABS, Australian Industry 2021-2022 *excl. ANZSIC 942 & 9499 due to unavailability of data (IVA)*

General Manufacturing & Engineering

Preliminary estimated shortage driver:

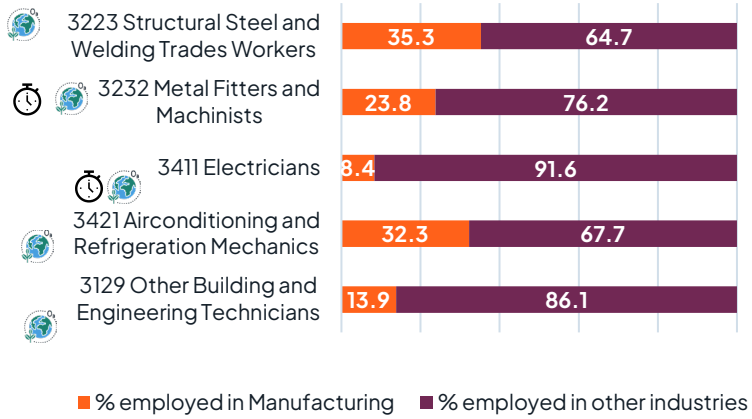
(R) Retention gap

Long training gap

Clean energy critical occupation

Qualifications from the MEM/MEM05 training package provides training for most occupations in this subsector.

Priority 4-digit ANZSCO occupation groups[1]
(by highest employment number), % employed in Manufacturing



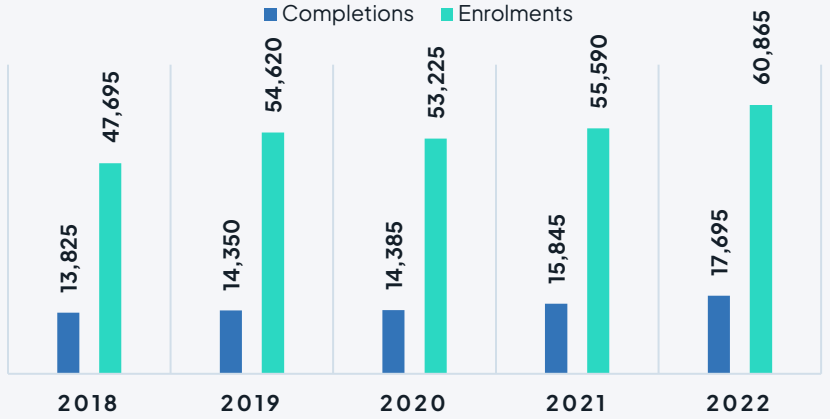
	Total no. employed in Manufacturing (estimated) 2021	No. of related training available (MEM qualification/s)
3223 Structural Steel and Welding Trades Workers	22,159	1
3232 Metal Fitters and Machinists	20,601	4
3411 Electricians	11,059	1
3421 Airconditioning and Refrigeration Mechanics	6,772	1
3129 Other Building and Engineering Technicians	3,542	8

MEM/MEM05 QUALIFICATION ENROLMENTS & COMPLETIONS TRENDS

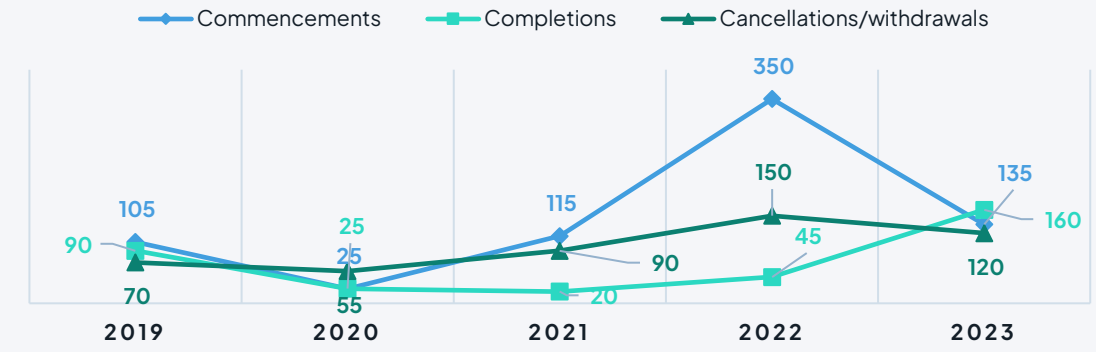
In 2022, there were

60,865 qualification enrolments
▲ **28%** since 2018

17,695 qualification completions
▲ **28%** since 2018



MEM APPRENTICE AND TRAINEE TRENDS (MARCH QUARTER)



354 RTOs are explicitly authorised to deliver MEM/MEM05 training in 2024[2]

9%	8%	5%	6%
FEMALE STUDENTS 2022	STUDENTS SPEAK A LOTE AT HOME 2022	STUDENTS HAVE A DISABILITY 2022	FIRST NATIONS STUDENTS 2022

46%
of MEM qualification enrolments in 2022 were apprentices/trainees

91%
of Metal and Engineering (MEM) students **were satisfied with training in 2022**

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Sources: ABS Census 2021 ANZSCO employment; NCVER – Total VET Students and Courses 2022 program enrolments and completions (student characteristics from 2022 enrolments); NCVER – Apprentices and Trainees March 2023; NCVER – Student Outcomes Survey 2022. All data rounded to nearest 5.
Note: 1. JSA, 2023 Skills Priority List – priority occupation groups = several 6-digit occupations within this group have a national, state/territory or region-specific shortage; 2. training.gov.au – current RTOs authorized to deliver training (with MEM training package components on scope) as of 5/3/2024

General Manufacturing & Engineering: Data Insights

All occupations identified in Mechanical Engineering Draftpersons and Technicians and Boat Builder and Shipwrights have been identified in national shortage.

+ 17%

Projected Employment Growth to 2033

Workforce Challenge
ATTRACTION AND INCREASING THE PIPELINE OF APPRENTICES

Where there are national shortages, JSA has identified long training gaps as a preliminary estimated shortage gap driver

Workforce Challenge
AGEING WORKFORCE

36% > 50 years old

9.8% < 25 years old

Workforce Challenge
LACK OF DIVERSITY

Training enrolments reflect low numbers of Women, People with Disabilities, People who speak a Language other than English and First Nation Students

22% female workers

Workforce Challenge
EMERGING SKILLS, OCCUPATIONS AND INDUSTRIES

Structural Steel and Welding Trades Workers, Metal Fitters and Machinists, Electricians and Air Conditioning and Refrigeration Mechanics identified as green energy critical occupations.

Other data, research and industry consultation to be undertaken for future workforce plans

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Source: *Summary of data insights from slides 33-34*

General Manufacturing & Engineering: Industry Themes

Four themes emerged from consultation with General Manufacturing and Engineering industry participants:

1. Workplace Flexibility and Agreements	Industry participants call for more flexible workplace arrangements to accommodate specific tasks and hours. This includes the need for arrangements that can adapt to varying workloads and requirements.
2. Knowledge Transfer and Training Quality	The importance of knowledge transfer within the workforce is highlighted, including the need to break down processes into simpler components for effective transfer. Additionally, the quality of Vocational Education and Training (VET) programs is acknowledged, although challenges such as travel to other campuses for specialised training are noted.
3. Diversity and Workplace Culture	Industry participants believe the industry could increase participation in manufacturing from underrepresented groups by addressing workplace conditions and culture. Developing staff into role models and integrating diversity needs into business planning are seen as crucial for success in this area.
4. Apprenticeship Pipeline and SME Recognition	Engaging with potential workers early and ensuring long-term funding models for training are highlighted as strategies to maintain a strong apprentice pipeline. Additionally, there's a focus on the role of SMEs in the manufacturing industry and the need for government recognition and support for these organisations, including providing recruitment and development options for apprentices.

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***Source**: Summary of themes that emerged from industry stakeholder engagement*