

*Australian Fluid Power Society Inc.*



The Australian Organisation for Fluid Power & Motion Control Professionals



*Fluid  
Power  
Training  
Information  
Brochure*



# What Is Australian Fluid Power Society Inc.?



Australian Fluid Power Society Inc. (AFPS) is registered as an incorporated Association in Victoria, Australia, and it is associated with Fluid Power Societies worldwide. The establishment of AFPS resulted from *The International Fluid Power Society of Australia Inc.* (IFPSA), based in Western Australia, and *Fluid Power Society Inc.* (FPS Inc.), based in Victoria, Australia, working together after the need for a national Fluid Power Society was recognised by both organisations in 2013.

The principal objectives of AFPS are to advance the national growth of fluid power technology, to foster activities aiding its development and application and also to share information, ideas and techniques in meeting the professional needs of people working in fluid power.

AFPS crosses all borders and provides a forum for the free exchange of ideas and creative thinking for the autonomous, state-based fluid Power Societies. AFPS regularly publishes *Fluid Talk* which is distributed by email to the members of all Fluid Power Societies in Australia and many other people at all levels of general industry and technical training organisations. Technical speakers from various industry organisations present the latest information on product developments and fluid power technology at regular state Society meetings.

The membership of the AFPS Executive Committee is representative of a broad spectrum of the fluid power industry and comprises fluid power component manufacturers, engineering consultants, fluid power systems designers and manufacturers, fluid power component service and installation companies and fluid power training companies. Additionally, industry occupations represented are managers, engineers, technicians, fitters, educators and specialist technologists as well as manufacturing, service, marketing and sales.

AFPS has established a **Curriculum Matrix** program to recognise people who have reached particular levels of knowledge and competency in the fluid power industry in the fields of systems engineering, component installation and servicing, sales and marketing, management and high pressure hose assembly (HPHA).

## Education & Training Programs

AFPS now conducts fluid power training courses due to fluid power training being largely neglected by mainstream training providers in Australia in recent years. As AFPS has an Australia-wide membership, the Society has access to a vast reservoir of theoretical and practical fluid power information which enables AFPS to develop fluid power courses based on the technology and techniques of today's fluid power industry.

AFPS courses offer participants the opportunity to learn about fluid power technology from basic levels to sophisticated servo control systems and beyond. Each course is designed to keep practising Engineers, Technicians and technical sales personnel abreast of new developments and applications whilst providing a basic understanding of technology to newcomers to the field.

In summary, AFPS functions in two principal areas of education:

- ✓ A certification program which recognises people who have reached specified levels of knowledge and competency in the fluid power industry. This program formally recognises the knowledge, competency and professionalism of fluid power specialists in the areas of systems engineering, sales, marketing, component service, component installation, management and high pressure hose assembly.
- ✓ In collaboration with formally-constituted education agencies, AFPS offers nationally recognised and customised training programs which function in parallel to allow an easy transfer between the two course types. A special emphasis is placed on updating the fluid power knowledge of current fluid power practitioners.



# Curriculum Matrix



The Australian Organisation for Fluid Power & Motion Control Professionals

## Australian Fluid Power Society Inc. FLUID POWER SKILLS CLASSIFICATION and CURRICULUM MATRIX

AFPS Reference	Unit of Competency	Description	HPHA - Hose Assembly	Mechanical Fitter	Technician Fluid Power
		Certification Level: Blue is a MANDATORY SUBJECT	II	III	IV
	MEM05005	Carry out mechanical cutting	X	X	
	MEM05007	Perform manual heating and thermal cutting		X	
	MEM05012	Perform routine manual metal arc welding		X	
	MEM05049	Perform routine gas tungsten arc welding		X	
	MEM05050	Perform routine gas metal arc welding		X	
	MEM06007	Perform basic incidental heat/quenching, tempering and annealing		X	
	MEM07005	Perform general machining		X	
	MEM07006	Perform lathe operations		X	
	MEM09002	Interpret technical drawing	X	X	
	MEM10006	Install machine/plant			X
	MEM10010	Install pipework and pipework assemblies			X
	MEM11011	Undertake manual handling	X		
	MEM12023	Perform engineering measurements	X	X	
	MEM12024	Perform computations		X	
	MEM13002	Undertake occupational health and safety activities in the workplace			X
	MEM13003	Work safely with industrial chemicals and materials	X		X
	MEM13014	Apply principles of occupational health and safety in the work environment	X	X	
	MEM14004	Plan to undertake a routine task	X	X	
	MEM14005	Plan a complete activity		X	
	MEM15002	Apply quality systems	X	X	
	MEM15024	Apply quality procedures	X	X	
	MEM16004	Perform internal/external customer service	X		
	MEM16005	Operate as a team member to conduct manufacturing, engineering or related activities	X		
	MEM16006	Organise and communicate information		X	
	MEM16007	Work with others in a manufacturing, engineering or related environment	X	X	
	MEM16008	Interact with computing technology		X	
	MEM17003	Assist in the provision of on-the-job training	X	X	
	MEM18001	Use hand tools	X	X	
	MEM18002	Use power tools/hand held operations	X	X	
	MEM18003	Use tools for precision work		X	
	MEM18004	Maintain and overhaul mechanical equipment		X	
	MEM18005	Perform fault diagnosis, installation and removal of bearings		X	
	MEM18006	Repair and fit engineering components		X	
	MEM18007	Maintain and repair mechanical drives and mechanical transmission assemblies		X	
	MEM18009	Perform leveling and alignment of machines and engineering components		X	
	MEM18010	Perform equipment condition monitoring and recording			X
	MEM18011	Shut down and isolate machines/equipment	X	X	
	MEM18012	Perform installation and removal of mechanical seals		X	
IPM *	MEM18018	Maintain pneumatic system components		X	
IPT *	MEM18019	Maintain pneumatic systems			X
IHM *	MEM18020	Maintain hydraulic system components		X	
IHT *	MEM18021	Maintain hydraulic systems			X
HSH *	MEM18022	Maintain fluid power controls			X
	MEM18055	Dismantle, replace and assemble engineering components		X	
C&C *	MEM18071	Connect/disconnect fluid conveying system components	X		X
C&C *	MEM18072	Manufacture fluid conveying conductor assemblies	X		X
	MSAENV272	Participate in environmentally sustainable work practices		X	

Note: \* Indicates that the International Fluid Power Society (IFPS) competency and the AFPS competency are not necessarily direct equivalents and the IFPS certification of a competency may NOT provide a full AFPS Curriculum Matrix competency credit.

# Introduction to Hydraulics Course



## Preamble

The following courses are delivered on behalf of *Australian Fluid Power Society Inc.* by *South Metropolitan TAFE* located at Rockingham in Western Australia.

## Objective

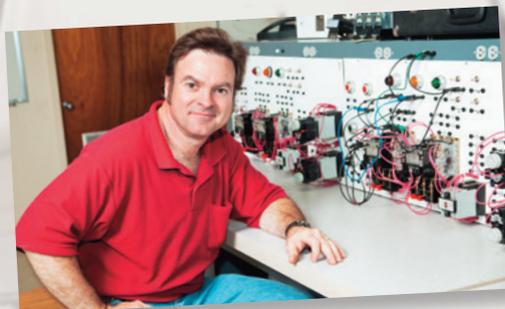
The objective of the one day course is to acquaint attendees with basic information on oil hydraulic technology and provide practical working information on the function of individual components commonly used in hydraulic systems. The course provides practical and theoretical information on each component as its function is explained.

## Who should attend

The *Introduction to Hydraulics* course is designed for people who have no or little knowledge of oil hydraulic engineering technology.

## Course content

- ✓ Hydraulic principles
- ✓ Hydraulic pumps – basic principles
- ✓ Hydraulic valves – basic principles
- ✓ Rotary and linear actuators – basic principles
- ✓ Understanding hydraulic fluids
- ✓ Hydraulic conductor sizing
- ✓ Graphic hydraulic symbols
- ✓ Basic hydraulic circuit design



## Outcomes

At the completion of the course, attendees should understand the following:

- ✓ The fundamental details of oil hydraulic components and systems
- ✓ Basic graphic hydraulic component symbols and how the symbols are assembled into hydraulic circuit diagrams
- ✓ The operation and application of commonly-used hydraulic valves, cylinders, pumps and motors

A certificate will be awarded to attendees who achieve a pass mark in a short examination at the end of the course.

## Assessment

Attendees will be assessed by examination on completion of the course.

Venue	Duration	Times
South Metropolitan TAFE, Rockingham Campus, WA	One day	9-00 am to 5-00 pm

## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures

# Hydraulics 1 Course

MEM18020 Maintain hydraulic system components



## Objective

To provide an understanding of oil hydraulic technology principles, components, graphic symbols and circuits.

## Who should attend

The course is designed for engineers, technicians, technical sales personnel, management personnel and other similarly-qualified people from all fields of engineering who have a minimal knowledge of the functioning of common oil hydraulic components and systems.

## Course content

- ✓ Hydraulic principles
- ✓ Reservoir design and maintenance
- ✓ Hydraulic pumps – basic principles
- ✓ Hydraulic valves – basic principles
- ✓ Rotary and linear actuators – basic principles
- ✓ Understanding hydraulic fluids
- ✓ Hydraulic conductor sizing
- ✓ Graphical hydraulic symbols
- ✓ Basic hydraulic circuit design



## Outcomes

On completion of the course, attendees will have been given information that will enable them to understand:

- ✓ The fundamental details of oil hydraulic components and systems
- ✓ Basic graphic hydraulic component symbols and how the symbols are assembled into hydraulic circuit diagrams
- ✓ The operation and application of commonly-used hydraulic valves, cylinders, pumps and motors

## Assessment

On completion of the course, attendees will be tested and assessed for theoretical and practical knowledge and competency with respect to the information provided during the course.



Venue	Duration	Times
South Metropolitan TAFE, Rockingham Campus, WA	Four days	8-00 am to 4-30 pm each day

## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures

# Hydraulics 2 Course

MEM18021 Maintain hydraulic systems



## Objective

To provide an understanding of advanced oil hydraulic systems and components, open and closed loop hydraulic circuits and hydraulic system faultfinding processes.

## Who should attend

The course is designed for engineers, technicians, technical sales personnel, management personnel and other similarly-qualified people from all fields of engineering who understand the technical information listed in the *Hydraulics 1* course.

## Course content

- ✓ Pilot operated pressure control valves
- ✓ Accumulators and unloading valves
- ✓ Variable flow hydraulic pumps and controllers
- ✓ Rotary and linear actuators – velocity & force calculations
- ✓ Open and closed loop circuit operation
- ✓ Faultfinding procedures
- ✓ Circuit testing
- ✓ Basic hydraulic circuit analysis



## Outcomes

On completion, attendees will have been given information that will enable them to understand:

- ✓ The operation and application of advanced hydraulic valves, pumps and motors
- ✓ A range of hydraulic system drawings and the operation of the hydraulic circuits depicted in the drawings
- ✓ Procedures used in hydraulic components and systems fault finding and testing

## Assessment

At the completion of the course, attendees will be tested and assessed for theoretical and practical knowledge and competency with respect to the course.



Venue	Duration	Times
South Metropolitan TAFE, Rockingham Campus, WA	Four days	8-00 am to 4-30 pm each day

## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures.

# Pneumatics 1 Course

MEM18018 Maintain pneumatic system components



## Objective

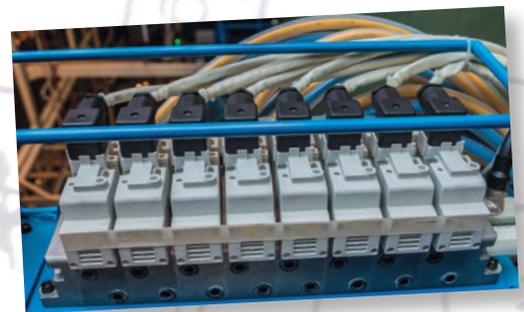
To provide an understanding of the technology, principles, components, graphic symbols and circuits commonly used in pneumatic systems.

## Who should attend

The course is designed for engineers, technicians, technical sales, management personnel and other similarly qualified people from all fields of engineering who have a minimal knowledge of the functioning of common pneumatic components and systems.

## Course content

- ✓ Pneumatic principles
- ✓ Air receivers – design and maintenance
- ✓ Air compressors – basic principles
- ✓ Pneumatic valves – basic principles
- ✓ Rotary and Linear Actuator – basic principles
- ✓ Pneumatic conductor sizing
- ✓ Graphic pneumatic symbols
- ✓ Basic pneumatic circuit design



## Outcomes

On completion of the course, attendees will have been given information that will enable them to understand:

- ✓ The fundamental details of pneumatic components and systems
- ✓ Basic graphic pneumatic component symbols and how the symbols are assembled into pneumatic circuit diagrams
- ✓ The operation and application of commonly-used pneumatic valves and cylinders, air receivers and air compressors

## Assessment

On completion of the course, attendees will be tested and assessed for theoretical and practical knowledge and competency with respect to the course.



Venue	Duration	Times
South Metropolitan TAFE, Rockingham Campus, WA	Four days	8-00 am to 4-30 pm each day

## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures

# Pneumatics 2 Course

MEM18018 Maintain pneumatic system components



## Objective

To provide an understanding of pneumatic system circuits and the maintenance, fault finding and repair procedures as applied to pneumatic systems.

## Who should attend

The course is designed for engineers, technicians, technical sales, management personnel and other similarly qualified people, from all fields of engineering who understand the technical information listed in the *Pneumatics 1* course.

## Course content

- ✓ Pneumatic components and systems testing, checking and adjustment
- ✓ The repair, replacement and overhaul of pneumatic assemblies
- ✓ Pneumatic power tools
- ✓ Air compressors
- ✓ The graphic symbols used to depict pneumatic system components
- ✓ Pneumatic circuit design and testing



## Outcomes

On completion, attendees will have been given information that will enable them to understand:

- ✓ Pneumatic systems
- ✓ The graphic pneumatic symbols used in circuit drawings
- ✓ Applied to a range of situations

## Assessment

On completion of the course, attendees will be tested and assessed for theoretical and practical knowledge and competency with respect to the course.



Venue	Duration	Times
South Metropolitan TAFE, Rockingham Campus, WA	Four days	8-00 am to 4-30 pm each day

## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures

# FLUID POWER TRAINING: Nationally accredited courses



## Preamble

The following nationally accredited, short course series courses are delivered on behalf of *Australian Fluid Power Society Inc.* by *Energy & Mining Training Solutions*.

## Objective-Nationally Accredited Courses

The training courses are intended for personnel who have completed an engineering trade course but who have not undertaken any fluid power training as part of their apprenticeship or post-trade training. The primary reason such people should attend the offered courses relate to duty-of-care obligations which personnel working in areas where fluid power systems are used, become subject to as soon as work of any type is carried out by such personnel on fluid power systems. The duty-of-care obligation also extends to all personnel working at maintaining or repairing fluid power systems and components to periodically refresh their knowledge and competency. The courses are nationally accredited and prerequisite knowledge and competencies are applicable.

## Hose and fitting competency course units:

MEM18071 Connect/disconnect fluid conveying system components

MEM18072 Manufacture fluid conveying conductor assemblies

MEM18011 Shut down and isolate machines/equipment

The above three units of competency are specifically intended for people wanting to acquire a fluid power engineering 'hose and fitting' accreditation. To become accredited, the course attendee must successfully complete a three day training course based on the knowledge and practical ability requirements of the above three competencies. Written and practical examinations are progressively conducted during the course. The course is of benefit to all personnel involved in the assembly of high and low pressure hose assemblies.



## Certificate II in Engineering – Fluid Power

The course is available to high pressure hose and fitting industry personnel who have been employed on a full time basis in the industry for a minimum of three months. The course is also well suited to personnel in fluid power businesses which provide a hose assembly service. Some principal benefits of a person acquiring this accreditation are those of the person being instructed in safe working procedures which meet customer worksite and statutory legislation, duty-of-care requirements. The qualification can only be acquired by onsite/workplace interviews and assessments which can be carried out on an individual basis or with a small number of people in a group.

This qualification is the prerequisite for an application for registration with *Australian Fluid Power Society Inc.* as a *High Pressure Hose Assembler* ('HPHA').

## MEM18020 Maintain hydraulic system components

The course is of great benefit to people who are required to identify fluid power components, people who are required to remove fluid power components from systems and carryout repair/rebuild work on the components and people who need to acquire the accreditation as an employment requirement. The course is of benefit to engineers, technicians, fitters and technical sales people.

## MEM18021 Maintain hydraulic systems

Working on a hydraulic system requires specific knowledge and skills to be able to safely maintain the hydraulic system and recognise component and system faults. The course teaches how to safely maintain hydraulic systems and how to recognise faults in such systems using industry-recommended techniques and practices. This course is of benefit to engineers, technicians and fitters.

## Course fees and dates

Contact Barry Catanach at *Energy & Mining Training Solutions* on ph. 0427 911 002 or [www.hydraskills.com.au](http://www.hydraskills.com.au) for current course dates and fee structures

# FLUID POWER TRAINING: Short course series – Introduction to Fluid Power



## Objective

The *Introduction to Fluid Power* short course series is designed to provide training for personnel who have an interest in or are new to the fluid power industry and need a basic level of fluid power knowledge to carry out work in administration, sales, equipment storage or some other part of a business. The courses also give administration staff a better technical appreciation of a company's core business. The courses have no prerequisites and are open to anyone wanting to improve their fluid power knowledge.

## Introduction to hydraulics

The course provides basic level information on how an oil hydraulic system works by showing the operation and function of individual hydraulic components. Information on the standard graphic symbols used to denote hydraulic components in documentation and how these symbols are shown in a common hydraulic circuit drawing is provided. This information is reinforced by practical exercises where attendees assemble hydraulic components into working systems on hydraulic training boards. The practical component of the course provides excellent experience to participants who have not previously assembled a working hydraulic system.

## Introduction to pneumatics

The course provides basic level information on how a pneumatic system works by showing the operation and function of individual pneumatic components. Information on the standard graphic symbols used to denote pneumatic components in documentation and how these symbols are shown in a common pneumatic circuit drawing is also provided. This information is reinforced by practical exercises where attendees assemble pneumatic components into working systems on pneumatic training boards. The practical component of the course provides excellent experience to participants who have not previously assembled a working pneumatic system.

## Introduction to basic fluid power drawings and graphic symbols interpretation

The successful completion of this course is essential to a person who needs to understand a fluid power circuit drawing to assist customers, identify fluid power components or carry out basic fluid power system faultfinding work. The course is also of benefit to anyone considering working in any area of the fluid power industry.

## Introduction to electrical logic system controls

The course provides information on the operation of how simple, low voltage, electrical circuits control a predetermined sequence in a hydraulic system by activating solenoid-operated, hydraulic control valves. An explanation of electrical circuit theory is given. This is supported by practical demonstrations of the equipment which gives participants the ability to interpret simple electrical circuits, to understand common electrical connection numbering procedures and to locate electrical connections on an electrical circuit and on an electrical ladder diagram. The electrical information provided in the course is set at an easy-to-understand level as the main purpose is to give mechanically-minded participants a good practical understanding of how an electrical circuit is used to control hydraulic valves and associated equipment. Attendees participate in practical exercises such as connecting electro-hydraulic valves to electrical circuits and then applying appropriate electrical signals to operate the valves. In the process of the practical exercises, attendees are given information on common, electro-hydraulic circuit, faultfinding procedures.

## Introduction to flexible hose assembly fabrication

The pressure resistance of any hose assembly is based on a relatively simple hose assembly process. The failure to correctly follow any part of the process can result in a catastrophic failure of the hose assembly. The course provides extremely important information on the essential requirements of hose cutting, correct hose fittings/adaptors selection and an explanation of the meaning of 'hose insertion'. Information is given on hose swaging and hose purchasing or working in a hose fabrication business. Successful completion of the course will not provide participants with full 'hose assembly fabricator' qualifications in accordance with the information contained in MEM18071 and MEM18072.

## Course fees and dates

Contact Barry Catanach at *Energy & Mining Training Solutions* on ph. 0427 911 002 or [www.hydraskills.com.au](http://www.hydraskills.com.au) for current course dates and fee structures

# FLUID POWER TRAINING: Short course series – Maintenance



## Objective

The purpose of the fluid power equipment maintenance series is to provide training on specific hydraulic components which require precise procedures to be carried out before the components are refitted and recommissioned to function in a hydraulic circuit. Safety is continually reinforced during all training sessions as it is of paramount importance when working on hydraulic components and systems. The maintenance training series is of benefit to personnel who are at trade, service, supervisory and engineer levels of employment and who wish to acquire professional development in fluid power.

## Maintaining and servicing bladder accumulators

This course provides information about non-fired pressure vessels and the requirement for such equipment to receive regular maintenance as well as training on how to depressurise an accumulator and remove the bladder.

The course is designed particularly for personnel who may be required to inspect, service or carry out the removal and replacement of a bladder in a bladder accumulator. The course is also of benefit to supervisors and engineers who wish to acquire professional development in fluid power.

## Pre-charging medium pressure accumulators

The course shows participants how to correctly pre-charge medium pressure accumulators. The accumulator pre-charging procedures taught during the course are those recommended by accumulator manufacturers and participants will be actively involved in carrying out the procedures. Incorrect bladder accumulator pre-charge procedures are a known and common cause of premature bladder failures and this course is ideal for anyone who needs to refresh their knowledge of the subject as well as anyone who has not ever charged an accumulator.

## Pre-charging accumulators using pressure booster equipment

The prerequisite requirement for participants in this course is a successful completion of the *Pre-charging Medium Pressure Accumulators* course in the previous three years. The material taught in the course shows participants how to safely and properly use gas, pressure-boosting equipment with a particular emphasis on working safely with high pressure, inert gas and the importance of correctly setting the gas booster pump stroke rate. The procedure is extensively used in the offshore oil and gas and the mining industries which makes the course particularly appropriate for personnel working at relevant occupations in those areas. The course is also of particular benefit to general accumulator service personnel and it is suitable for supervisors and engineers who wish to acquire professional development in fluid power.

## How to carry out a hose audit

Many companies and businesses that use fluid power systems, have a register of fluid power hoses as part of a safety system. Whilst all such businesses should have a current high pressure hose register, it is not unusual for no such register to exist and in a significant number of businesses, the register is not satisfactorily maintained. A properly arranged high pressure hose register must contain specific information and the course shows participants how to set up such a register, how to ensure that essential information is recorded in the register and how to properly maintain it. The course is of particular benefit to plant maintenance and high pressure hose assembly personnel as well as supervisors and engineers who wish to acquire professional development in fluid power.

## Course fees and dates

Contact Barry Catanach at *Energy & Mining Training Solutions* on ph. 0427 911 002 or [www.hydraskills.com.au](http://www.hydraskills.com.au) for current course dates and fee structures

# FLUID POWER TRAINING: Short course series – Component-specific courses



## Objective

The purpose of the component-specific, short course series is to provide participants with particular training which is focused on one oil hydraulic component. The training courses are designed to provide specific training to personnel who are not able to attend training courses which require them to leave their workplace for some days at a time. The training is of benefit to engineers, technicians, fitters and technical specialists.

## Piston pump displacement controller operation

Variable displacement pump controllers are pump control mechanisms which are mounted to variable displacement pumps and which modulate pump output pressure and flow. Pump controllers can be configured in many different ways to suit the particular operation of each hydraulic circuit. The course teaches participants

about the parts that make up a controller, its operating principle and how to safely and correctly adjust controllers to achieve maximum pump efficiency. The training is of benefit to engineers, technicians, fitters, technical specialists and mechanical maintenance personnel.

## Piston pump displacement controller operation – load-sensing systems

Load sensing-controlled, variable displacement, piston pumps are extensively used on single and multi-function, open loop hydraulic systems to minimise heat generation. However, the functioning and correct setting of the controller is often not well understood. The course provides the opportunity to learn from fluid power industry specialists how the controller functions and how to set it correctly to maximise pump and hydraulic system efficiency and minimise system heat generation. The training is of benefit to engineers, technicians, fitters, technical specialists and mechanical maintenance personnel.

## How to re-build gear pumps

The information in this course has been drawn from – and is taught by – a fluid power industry specialist in gear pumps. Much of that taught has been gleaned from many years of designing, improving and building pumps to give a long and reliable service life which is not shown in text books on the subject. The training is of benefit to engineers, technicians, fitters and technical sales and mechanical maintenance personnel.

## Inspection and rebuilding vane cartridge pumps

The information in this course has been drawn from – and is taught by – a fluid power industry specialist in vane pumps. The course covers important details of vane pump operation, the causes of vane pump failure and how to strip down, refurbish and re-assemble a vane pump. The training is of benefit to engineers, technicians, fitters and technical sales and mechanical maintenance personnel.

## Testing and setting relief valves

Relief valves are an integral part of the safety system of hydraulic circuits and an incorrectly-set relief valve can result in excessive system heat generation, power wastage and extensive damage to the hydraulic system. The information in this course has been drawn from – and is taught by – a fluid power industry specialist in relief valves and the course shows participants the operation of common relief valve types and how to correctly set each type of valve. The training is of benefit to engineers, technicians, fitters and technical sales and mechanical maintenance personnel.

## How to perform hydraulic pressure and flow tests using an in-line meter

During this course, a fluid power industry specialist shows course participants how to set up and perform hydraulic pressure and flow tests and then the participants carry out practical tests themselves. The results of testing a hydraulic pump are discussed and attendees are shown how to determine whether or not the pump test information indicates a decline in efficiency and a requirement for further examination of the pump operation. The training is of benefit to engineers, technicians, fitters and technical sales and mechanical maintenance personnel.

## Course fees and dates

Contact Barry Catanach at *Energy & Mining Training Solutions* on ph. 0427 911 002 or [www.hydraskills.com.au](http://www.hydraskills.com.au) for current course dates and fee structures

# OIL HYDRAULIC SAFETY COURSES



## Online fluid power safety training courses

Australian Fluid Power Society Inc., in conjunction with International Hydraulic Safety Authority, is promoting occupational health and safety courses specifically designed for people working in the fluid power industry and companies which use fluid power systems in manufacturing or industrial processes.

Fluid power systems and electrical systems are both forms of transmitting energy from one point to another and 'hydraulics', a common term for a fluid power system which uses a liquid as the energy transmitting medium, is often described as being 'mechanical electricity'. Inherent danger exists in any energy-transmitting system and whilst electrical systems are covered by extensive safety standards and statutory requirements, hydraulic systems are subject to significantly less regulation. As a result, failures in fluid power systems are more prevalent than those in electrical systems and the common effects of hydraulic failures to people are soft tissue injuries, crushing injuries, bone fractures and dislocations, lacerations and skin punctures, burns, fluid injection injuries and other serious injuries which occasionally result in death.

Hydraulic failures can also result in a supported load falling, other property and equipment damage and environmental damage.

## Universally-compatible viewing

All courses are created using standards that allow playback on most internet-capable devices with standard web browsing capabilities including *Apple iTouch*, *iPad* and *iPhone* as well as most other 'smart' phones and tablets including those with *Android* and *Windows* operating systems.

## Investment In Safety

Investing time in safety training is a vital part of ensuring long-term business success. Safety knowledge not only supports safe work practices but it increases worker productivity and it reduces the possibility that a business will need to meet the cost of workplace accident claims and possibly, prosecution by a Statutory Authority. It is a well-known fact that the employees of a business are happier and more productive when the business places a high value on their well-being by instituting and maintaining workplace safety systems and programs and that financial investment in safety increases the profitability of a business.



# FLUID INJECTION AWARENESS:

## Online course



### Overview

Pressurised fluids are common in all areas of industry as well as domestic homes and should always be considered extremely hazardous. The e-learning awareness course identifies such hazards and provides the course participant with information on ways of mitigating this hazard. Fluid injection injuries can lead to the loss of fingers and limbs, long term paralysis and death.

The incident reports presented throughout this comprehensive course are graphic and show how severe fluid injection injuries can be. The course also provides information on appropriate first aid methods. Understanding and identifying where these hazards exist will greatly reduce a course participant's risk of injury.

### Course topics:

The following topics are covered in the online Fluid Injection awareness course:

- ✓ Fluids descriptions
- ✓ Common fluids involved in injection injuries
- ✓ Fluid pressure and velocity relationship
- ✓ First aid after a fluid injection injury
- ✓ Effects of injected fluids on the human body
- ✓ Personal Protection Equipment (PPE)
- ✓ Guarding against injury
- ✓ Avoiding a fluid injection injury
- ✓ Pressure resulting from thermal expansion
- ✓ Energy hazards: identification and control
- ✓ Pressurised vessels

### Course duration

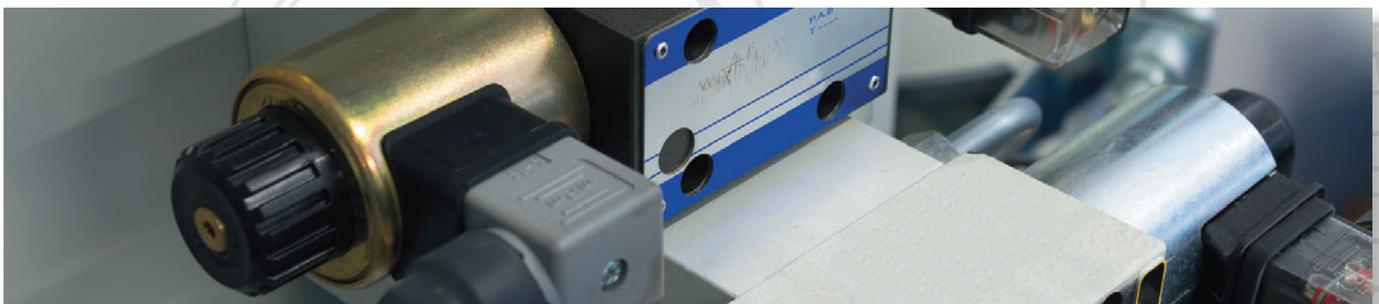
Approximately 45 minutes.

### Course testing

Testing is conducted during the online *Fluid Injection Awareness* course as it is designed to reinforce the presented information. Supplementary material necessary to complete the course is prompted at the commencement of the course and is accessible in the *print document* tab.

### Certificate of completion

The *Certificate of Completion* will be available for downloading and printing after successful completion of the course.



### Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures.

# HYDRAULIC SAFETY IN CONSTRUCTION: Online course



## Overview

Even though hydraulically operated equipment is used in all areas of construction, many construction workers are not aware of the safety hazards associated with using and being near such equipment. Some types of injuries which can occur through people using or being near hydraulic equipment are soft tissue injuries, crushing injuries, bone fractures and dislocations, lacerations and skin punctures, burns, fluid injection injuries and other serious injuries which occasionally result in death. The failure of hydraulic equipment can also cause environmental damage through liquid spills and property and equipment loss due to mechanical failure and fire.

The course contains over 800 visual learning aids including many video-films, animated diagrams and procedural and referenced documents. The purpose of the course is to provide important information which will assist in eliminating safety hazards and reducing the risk of injury to workers and damage to equipment and the environment. The course, in combination with a full hydraulic safety program, will greatly reduce the risks mentioned above.

The course complements the online, *Hydraulic Safety: Exposure Level* and *Hydraulic Safety: High Risk Maintenance Level* courses.

## Hydraulic Safety In Construction Online Course Online Course Topics

- ✓ Health and exposure
- ✓ Ethics and standards
- ✓ Hoses
- ✓ Stored energy
- ✓ Threads and porting
- ✓ Seals
- ✓ Safety devices
- ✓ System pressure bleed down
- ✓ Mechanics and geometry
- ✓ Welding
- ✓ Hazard assessment
- ✓ Beyond lockout
- ✓ Environment
- ✓ Ethical choices

## Course duration

Approximately 5 hours.

## Course testing

Tests are conducted during the presentation of the course to reinforce the information provided in the online *Hydraulic Safety in Construction* course. A test result mark of 80% must be achieved in order to receive a *Certificate of Completion*. Participants are able to repeat the course two more times if the pass mark is not achieved at the first attempt. Supplementary materials necessary to complete the course are accessible online.

## Online certificate of completion

The course *certificate of completion* which is valid for a period three years after the certificate is granted, will be available for downloading and printing after the successful completion of the course.



## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures.

# HYDRAULIC SAFETY: HIGH RISK MAINTENANCE LEVEL – Online course



## Overview

The maintenance and repair of equipment fitted with hydraulic systems is extremely hazardous to the personnel involved in the work and also to everyone in the vicinity of the equipment. Maintenance and repair personnel are required to carry out procedures that expose them to high levels of risk of injury or death due to inherent hydraulic system safety hazards. Many incidents of injury to people are a result of them working on hydraulic systems and not understanding the safety hazards associated with the work. The course provides participants with comprehensive information on how to recognise and manage the relevant hydraulic safety hazards and a strong emphasis is placed on information on the implementation of structured procedures to overcome the hazards as is information on energy mitigation.

## Course topics:

The following topics are covered in the course:

- ✓ What are hydraulic fluids and what are the effects of human exposure to the fluids?
- ✓ Potential hydraulic system safety hazards
- ✓ Personal protection equipment (PPE)
- ✓ Safety standards and qualifications
- ✓ Recognised Standards and your role in the implementation of Standards
- ✓ Hose fabrication applications and construction
- ✓ Life cycle specifications and Standards
- ✓ Accumulators and the application of accumulators in hydraulic systems
- ✓ Procedures for testing and discharging accumulators
- ✓ Hazardous energy and the cause of unexpected movement
- ✓ Guarding and safety valves
- ✓ System design considerations
- ✓ Safety through engineered controls
- ✓ Pressurised grease safety hazards
- ✓ Effects of air in hydraulic systems
- ✓ Establishing a 'zero energy state'
- ✓ General responsibilities and safety hazard assessment
- ✓ Pre-work inspections and what is 'lock out'?
- ✓ Lockable devices and the importance of 'sequence'
- ✓ Hydraulic fluids and the environment
- ✓ Spill preparedness and acceptable disposal practices
- ✓ Biodegradable hydraulic fluids and absorbents
- ✓ Ethical choices
- ✓ Hydraulic accidents and fatalities
- ✓ Effects of modifications to hydraulic components
- ✓ Hazards of welding hydraulic components and interconnections
- ✓ Fluid power calculations
- ✓ Gravity, overhanging and runaway load hazards
- ✓ Types of seals and applications
- ✓ The importance of mechanical seals
- ✓ Understanding maintenance and planning
- ✓ Commonly used hydraulic threads and porting
- ✓ Definition of 'pressure rating'

## Course duration

Approximately 10 hours.

## Course testing

Testing conducted during the online course is designed to reinforce the information presented in the course. Supplementary materials necessary to complete the course can be accessed online.

## Certificate of completion

Participants will receive a *certificate of completion*, hard hat sticker and wallet cards by mail within 21 business days of a successful course completion. Certificates and wallet cards are valid for 3 years from the awarding of the certificate.



## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures.

# HYDRAULIC SAFETY: EXPOSURE LEVEL – Online course



## Overview

People are exposed to hydraulic systems at many different levels and many hydraulic accidents and fatalities are a result of people working around hydraulic systems without understanding the related safety hazards.

The course provides participants with information which gives them an awareness of hydraulic safety hazards in the workplace. During the course, special attention is given to many common misconceptions about hydraulic safety hazards including those relating to environmental health.

## Course topics

The following topics are covered in the online course:

- ✓ Hydraulic fluids
- ✓ The effects of human exposure to hydraulic fluids
- ✓ Potential hydraulic system safety hazards
- ✓ Personal protective equipment (PPE)
- ✓ Safety standards and qualifications
- ✓ Your role in your workplace
- ✓ Types of hydraulic hoses and hydraulic hose construction
- ✓ Hydraulic hose applications
- ✓ Hydraulic hose assembly fabrication methods
- ✓ Specifications and Standards
- ✓ Equipment life cycle limits
- ✓ Accumulator operation and the application of accumulators in hydraulic systems
- ✓ Forms of hazardous energy
- ✓ Commonly-used hydraulic thread connections
- ✓ Hydraulic equipment pressure ratings
- ✓ Types of hydraulic seals and seal applications
- ✓ Hydraulic equipment maintenance and maintenance planning
- ✓ Importance of seal guarding
- ✓ Hydraulic system considerations
- ✓ Hydraulic devices
- ✓ Pressurised grease safety hazards
- ✓ The effects of gravity on hydraulic machinery
- ✓ Overhanging loads and run-away load hazards
- ✓ The effects of modifying hydraulic components
- ✓ The hazards of welding hydraulic components
- ✓ The purpose of a safety hazard assessment
- ✓ General responsibilities

## Course duration

Approximately 4.5 hours.

## Course test

Testing conducted during the online course is designed to reinforce the information presented in the course. Supplementary materials necessary to complete the course can be accessed online.

## Certificate of completion

Participants will receive a *certificate of completion*, hard hat sticker and wallet cards by mail within 21 business days of a successful course completion. Certificates and wallet cards are valid for 3 years from the awarding of the certificate.



## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures.

# INDUSTRIAL HYDRAULIC MECHANIC Certification



## Certification description

An *Industrial Hydraulic Mechanic* fabricates, assembles, services, maintains and tests industrial hydraulic equipment. An *Industrial Hydraulic Mechanic* needs to understand hydraulic graphic symbols and electrical principles, be able to read hydraulic system circuit diagrams and must be skilled in using hand tools, power tools, micrometers and testing equipment. *Industrial Hydraulic Mechanic* certification requires the successful completion of a three hour written test and a three hour practical job performance test.

## Who should attend

This course is designed for mechanical fitters, hydraulic fitters, instrument fitters and heavy-duty plant mechanics and other similarly-qualified people.

## Course content

- ✓ The reading of hydraulic graphic symbols and circuit diagrams
- ✓ The use of dial calipers and micrometers
- ✓ The identification of various tube fittings and the selection of correct replacement units
- ✓ The manufacture of tube assemblies
- ✓ The prevention of and repair of hydraulic system fluid leaks
- ✓ The exercise of contamination control when:
  - ✓ Adding fluid to a hydraulic system using a filter cart
  - ✓ Flushing and commissioning a hydraulic system
  - ✓ Taking fluid samples including showing knowledge of where, when and how to carry out the task
- ✓ The use of a Target Cleanliness Chart
- ✓ The determination of the condition of hydraulic filters
- ✓ The checking hydraulic systems for water
- ✓ The correct manufacture of a crimped/swaged hose assembly
- ✓ The safe and correct replacement of a hose assembly
- ✓ The inspection of installed hose assemblies to determine hose twist and minimum bend radius
- ✓ The safe and correct servicing and charging of accumulators
- ✓ The provision of assistance to technicians during the commissioning and the start-up of hydraulic systems
- ✓ The implementation of safe work practices when working with hydraulic systems

## Outcomes

Internationally-recognised certification awarded by *International Fluid Power Society*, USA, as a Hydraulic Mechanic following a successful assessment having been undertaken.



## Assessment

Certification as an *Industrial Hydraulic Mechanic* (IHM) requires the successful completion of a three hour written and a three hour practical, job performance test.

Venue	Duration	Times
South Metropolitan TAFE, Rockingham Campus, WA	Four days	8-00 am to 4-30 pm each day

## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures.

# CONNECTOR AND CONDUCTOR (C&C) Certification



The Australian Organisation for Fluid Power & Motion Control Professionals

## Certification description

The success or failure of any fluid power system is dependent on the design, installation, commissioning and maintenance of the system. Hose and tube assemblies are a vital part of each of these four factors as well as being critical to the safety of personnel and the system. The course teaches principles and practices associated with the safe fabrication of hydraulic hose and tube assemblies.

## Who should attend

This course is designed for hose assemblers, pipe fitters, mechanical fitters, hydraulic fitters, heavy-duty plant mechanics and other similarly-qualified people.

## Course content

- ✓ An understanding of the basic components of hose construction
- ✓ The identification of hose types and the applicable pressure ratings
- ✓ The identification of port and fitting threads using measuring tools and charts
- ✓ The identification of different types of four-bolt flanges
- ✓ The use of appropriate charts to determine the pressure ratings of stainless and carbon steel tubing
- ✓ The use of the 'stamped' acronym in selecting correct and compatible hose and tube assembly components
- ✓ An understanding of metric and imperial measurement standards to ensure the correct assembly of components
- ✓ The square-cutting of fluid power hose to a pre-determined length
- ✓ The 'skiving' of fluid power hoses – when and how
- ✓ The inspection and calibration of crimping/swaging machines to ensure correct hose crimping/swaging
- ✓ The use of calipers to measure the dimensions of a crimp/swage
- ✓ Carry out tube flaring to make a tube assembly
- ✓ Inspect a non-flared tube assembly
- ✓ Inspect a 'twin ferrule' tube assembly
- ✓ Identify and use codes and Standards in the assurance of quality and safety during C&C assembly fabrication
- ✓ Provide safety guards with reference to C&C line-of-sight failures and conductor abrasion
- ✓ Provide documentation
- ✓ The correct disposal of used C&C assemblies

## Outcomes

Internationally-recognised *Connector and Conductor* certification from *International Fluid Power Society*, USA.



## Assessment

The Connector & Conductor Certification course requires the successful completion of a three hour written and a three hour practical job performance test.

Venue	Duration	Times
South Metropolitan TAFE, Rockingham Campus, WA	Four days	8-00 am to 4-30 pm each day

## Course fees and dates

Contact Ian McDonald at South Metropolitan TAFE on (08) 9599 8615 or [ian.mcdonald@smtafe.wa.edu.au](mailto:ian.mcdonald@smtafe.wa.edu.au) for current course dates and fee structures.

# Promoting Fluid Power Awareness Education and Certification



The Australian Organisation for Fluid  
Power & Motion Control Professionals



The Australian Organisation for Fluid  
Power & Motion Control Professionals

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