



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **PRMPFES25C Inspect, test and maintain gaseous fire suppression systems**

**Release: 1**

## PRMPFES25C Inspect, test and maintain gaseous fire suppression systems

### Modification History

Not Applicable

### Unit Descriptor

#### Unit descriptor

This unit of competency specifies the outcomes required for a service technician to complete mechanical inspection, testing and maintenance tasks on installed gaseous fire suppression systems. All work in this area must be completed in accordance with relevant legislative, industry, customer and organisational requirements, including policies and procedures relating to ozone depleting substances (ODS) and synthetic greenhouse gases (SGG) emissions and occupational health and safety (OHS).

**Note:** The service technician is not permitted to undertake any installation, replacement, maintenance and repair functions that are restricted to licensed trades or occupations (subject to relevant state and territory regulations). This unit of competency does **not** cover **all** requirements of AS 1851.

### Application of the Unit

#### Application of the unit

This unit of competency supports one or more extinguishing agent handling licences prescribed under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*.

### Licensing/Regulatory Information

Not Applicable

### Pre-Requisites

Not Applicable

### Employability Skills Information

Not Applicable

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

### ELEMENT

### PERFORMANCE CRITERIA

- |   |  |
|---|--|
| 1 Interpret and comply with legal and industry requirements relating to service operations. | 1.1 Apply knowledge and understanding of <b>legislative requirements</b> , including relevant state and territory building codes, manufacturer documentation and Australian standards to <b>work procedures</b> and clarify where necessary with <b>relevant persons</b> . |
|   | 1.2 Apply knowledge and understanding of <b>ODS and SGG</b> legislative and industry requirements to inspect and test gaseous fire suppression systems.  |
|   | 1.3 Apply knowledge and understanding of the operation of fire protection systems to determine system key functional requirements and operation within design limitations.   |
|   | 1.4 Identify <b>potential and actual breaches</b> of legislative and industry requirements and take action according to <b>organisational requirements</b> , and ODS, SGG and <b>OHS policies and procedures</b> .   |
| 2 Identify requirements and components of the gaseous fire suppression system.              | 2.1 Identify <b>gaseous fire suppression system</b> application and method of operation.   |
|   | 2.2 Identify and locate <b>system components</b> of the gaseous fire suppression system according to function, manufacturer manuals, Australian standards and installer documentation.   |
|   | 2.3 Verify system layout is in accordance with <b>installation drawings</b> .  |
|   | 2.4 Identify <b>isolation devices</b> for <b>gaseous fire suppression systems</b> and interface controls to other systems.   |
|   | 2.5 Identify potential and actual breaches of the gaseous fire suppression equipment and system performance according to Australian standards, relevant state and territory building codes, and manufacturer documentation.  |
| 3 Prepare to inspect, test and maintain gaseous fire suppression systems.                   | 3.1 Organise all necessary <b>work permits</b> prior to entering customer premises.  |
|   | 3.2 Advise <b>relevant persons</b> and occupants of protected areas and areas surrounding test site, of intended test and procedures required by Australian standards and manufacturer   |

**ELEMENT****PERFORMANCE CRITERIA**

- recommendations.
- 3.3 Assess system and surrounding work area for *hazards*.
- 3.4 Identify and assemble *tools, equipment and testing devices* for inspect, test and maintain procedures according to *work procedures* and *organisational requirements*.
- 3.5 Switch alarm signalling equipment (ASE) to test mode where *back-to-base facilities* transmit a signal to monitoring centre during test tasks.
- 3.6 Physically isolate equipment and gaseous fire suppression function to ensure testing or maintenance procedures do not cause discharge of extinguishing agent.
- 3.7 Electrically isolate equipment and interface controls to other systems so no alarms are unduly generated.
- 3.8 Install and calibrate test equipment to verify operation of components and system.
- 4 Inspect installed gaseous fire suppression system.
- 4.1 Identify and locate *system components* of gaseous fire suppression system according to function and manufacturer manuals.
- 4.2 Complete *mechanical inspection tasks* specified for *maintenance schedule periods* described in the current Australian standards, manufacturer specifications and procedures, service manual instructions and service bulletins.
- 4.3 Follow all safety procedures during inspection.
- 4.4 Complete *documentation*, record inspection results and report faulty equipment according to Australian standards, *work procedures*, technical specifications and *customer requirements*.
- 5 Test installed gaseous fire suppression system.
- 5.1 Complete *mechanical test tasks* specified for maintenance schedule periods described in the current Australian standards, manufacturer specifications and procedures, service manual instructions and service bulletins.
- 5.2 Follow all safety procedures during testing.

**ELEMENT****PERFORMANCE CRITERIA**

- |   |  |   |
|---|--|---|
| 6 | Conduct preventive maintenance on installed gaseous fire suppression system. | <p>5.3 Complete <i>documentation</i>, record test results and report faulty equipment according to Australian standards, <i>work procedures</i>, technical specifications and customer requirements.</p> <p>6.1 Complete the <i>mechanical preventive maintenance tasks</i> specified for <i>maintenance schedule period</i> described in the current Australian standard, according to <i>legislative requirements</i>, manufacturer specifications and procedures, service manual instructions and service bulletins.</p> <p>6.2 Repair or replace faulty equipment according to Australian standards, <i>work procedures</i>, technical specifications and customer requirements.</p> <p>6.3 Organise transportation and refilling of gaseous agent containers by authorised refilling station.</p> <p>6.4 Follow all safety procedures during preventive maintenance.</p> <p>6.5 Complete <i>documentation</i> and record preventive maintenance results, repairs and replacements of faulty equipment according to Australian standards, <i>work procedures</i>, technical specifications and customer requirements.</p> |
| 7 | Reinstate installed gaseous fire suppression system.                         | <p>7.1 <i>Reinstate</i> installed gaseous fire suppression system to fully operational state.</p> <p>7.2 Leave customer premises in a clean and tidy condition on completion of work.</p>   |

**Required Skills and Knowledge****REQUIRED SKILLS AND KNOWLEDGE**

This section describes the essential skills and knowledge and their level, required for this unit.

**Required skills:**

- use hand and power tools safely and with dexterity
- conduct visual mechanical inspection, test and maintenance tasks as specified in AS 1851
- handle and transport gaseous containers according to legislation (including ODS and SGG requirements) and manufacturer and work procedures
- identify if gaseous agent is still suitable for existing occupancy risk

- operate standardised control functions on a fire alarm panel that interfaces with the gaseous system to conduct functional tests as specified in AS 1851
- operate actuation control devices to determine that operation is within design parameters for installed equipment
- conduct function system tests with other system interfaces as specified in AS 1851
- conduct routine mechanical maintenance on equipment as specified in AS 1851
- interpret information on engineering drawings, such as installation drawings
- verify visually that system complies with original installation requirements
- operate manual controls of gaseous fire suppression system
- remove and replace container actuation control devices (note: the technician may require manufacturer endorsement for specific actuation control devices)
- remove and replace containers from container bank manifold
- report and record information neatly and legibly when completing documentation
- plan and organise work in order to estimate time to complete activities and prioritise tasks
- apply language, literacy and numeracy skills to:
  - communicate with others in a clear and concise manner in verbal, non-verbal and written modes
  - read, understand and comply with work instructions and specifications
  - read, understand and record measurements
- use appropriate workplace housekeeping procedures
- use effective customer service skills and relate to people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities.

**Required knowledge:**

- key features of legislation, regulations and standards, including ODS and SGG, applicable to inspecting, testing and maintaining gaseous fire suppression systems
- implications of **not** applying legislative requirements to job functions
- action to take when a breach of OHS, ODS and SGG or other policies occurs
- reasons for preventing ODS and SGG emissions in the workplace
- industry best practice methods used to isolate actuation control devices to prevent ODS and SGG emissions in the workplace
- extent to which pressures and liquid levels in extinguishing agent containers vary according to temperature change
- container handling, moving and transporting requirements
- pressures generated during release of gaseous agents, pressure rating requirements of pipework and fittings, and the need for adequate support bracing
- principles of operation of gaseous agent discharge nozzles
- difference between various types of extinguishing gaseous agents used
- operation of different types of equipment used to store and release gaseous extinguishant agent
- fire suppressant action of gaseous agents in terms of smothering, cooling and reacting chemically with the fire radical
- concentration and holding time requirements of various gaseous agents to extinguish a fire in relation to flooding factor and agent storage requirements
- how building structures, services and service penetration within and through protected area enclosures influence the holding time of a gaseous agent
- occupational hazards of gaseous agent in terms of:
  - no observable adverse effect level (NOAEL)

- lowest observable adverse effect level (LOAEL)
- by-products of combustion associated with gaseous agent in a fire condition
- various gaseous fire suppression agents and their operation, including total flooding and local application
- operating principles of lock-off, directional and pressure release valves
- operating principles of pneumatic and mechanical actuation systems interfaced with gaseous systems
- operating principles of fire alarm components interfaced with gaseous fire suppression system
- working principles and relevant Australian standards in respect of gaseous fire suppression systems
- relevant international codes of practice
- safety requirements relevant to inspect, test and maintain procedures
- Environment Protection Authority, ODS and SGG emission requirements
- relevant federal, state or territory legislation that affects organisational operations, including:
  - anti-discrimination and diversity
  - equal employment opportunity
  - industrial relations.

### KEY COMPETENCIES

The seven key competencies represent generic skills considered necessary for effective participation by an individual in the workplace.

Performance level 1 - at this level the candidate is required to undertake tasks effectively.

Performance level 2 - at this level the candidate is required to manage tasks.

Performance level 3 - at this level the candidate is required to use concepts for evaluating and reshaping tasks.

Key competency	Example of application	Performance level
How are ideas and information communicated?	Gather information from a number of sources, including regulatory, manufacturer, organisational and customer sources, to enable accurate inspecting, testing and maintenance activities to occur.	2
How can information be collected, analysed and organised?	Discuss and confirm customer requirements and complete administrative documentation.	2
How are activities planned and organised?	Plan mechanical inspection and maintenance activities to assemble appropriate tools and hardware for on-site services and organise work schedules to suit customer and organisational requirements.	2



Key competency	Example of application	Performance level
How is teamwork used?	Apply consultative and collaborative approaches through support and assistance provided to customers and work groups.	1
How are mathematical ideas and techniques used?	Apply mathematical techniques to on-site mechanical inspection, test and maintenance tasks.	2
How are problem-solving skills applied?	Identify potential problems throughout mechanical inspect and test activities especially with regard to ambiguous information received from information sources, and identify processes to be followed when unusual faults are detected.	3
How is the use of technology applied?	Demonstrate sound technical knowledge of equipment functions to allow accurate inspection, testing and maintenance to occur.	2

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

#### Overview of assessment

- Competency in this unit underpins competency in other aspects of the candidate's role in managing work tasks.
- This unit could be assessed on its own or in combination with other units of competency relevant to the job function.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

- Competency is to be demonstrated through at least one practical demonstration covering the full range of performance criteria.
- Type of gaseous fire suppression system tested should correlate to the workplace setting of the candidate.
- Ability to transfer skills to other situations

described in the range statement may be inferred from this assessment. (Oral questioning may be used to provide evidence of this ability.)

- A person who demonstrates competency in this unit must be able to provide evidence of:
  - locating, interpreting and applying relevant information, standards and specifications
  - complying with OHS and ODS and SGG regulations (where required) and state and territory legislation applicable to workplace operations
  - complying with organisational policies and procedures, including quality requirements
  - communicating and working effectively and safely with others.
- In a minimum of two different settings:
  - identifying potential risks and hazards
  - identifying risk reduction measures
  - adhering to safety procedures during inspect, test and maintain procedures
  - identifying installed gaseous fire suppression system
  - identifying and locating system components
  - identifying, selecting and using tools, equipment and materials effectively to perform inspect, test and maintain procedures on an installed gaseous fire suppression system
  - matching installed system to installation drawings
  - identifying isolation devices and interface controls to other systems
  - switching alarm signalling equipment to test mode
  - physically isolating equipment and gaseous fire suppression system
  - electrically isolating equipment and interface controls to other systems
  - installing and calibrating test equipment
  - completing specified mechanical inspection tasks, documenting results and reporting faulty equipment
  - completing specified mechanical test tasks,

**Specific resources for assessment**

- documenting results and reporting faulty equipment
- completing specified mechanical preventive maintenance tasks, repairing or replacing faulty equipment and documenting results
- reinstating system to operational state
- completing workplace housekeeping requirements.

**Context of assessment**

- The following resources should be available:
  - access to customer premises or a simulated workplace environment
  - assessment documentation
  - all necessary tools, specialist equipment, manuals and relevant documentation, including ODS and SGG policies and work procedures
  - training and assessment record books.
- Where applicable, physical resources should include equipment modified for people with disabilities.
- Access must be provided to appropriate learning and/or assessment support when required.
- Assessment processes and techniques must be culturally appropriate, and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.
- For valid and reliable assessment of this unit, competency should be demonstrated over a period of time and be observed by the assessor (or assessment team working together to conduct the assessment).
- Competency is to be demonstrated in a range of situations, reflecting the practical requirements of the workplace which may include customer and workplace interruptions and involvement in related activities normally experienced in the workplace.
- Assessment of competency over the full range of performance criteria should be made through practical demonstrations at a customer's premises. However, at times this may not be practicable, and in these situations, the conditions normally available to the candidate may be simulated in an environment suitable

for assessment.

- Candidates should also be given the opportunity to practise and undertake self-assessment of performance before requesting formal assessment.
- Oral questioning or a written assessment may be used to assess underpinning knowledge. (In assessment situations where the candidate is offered a preference between oral questioning and written assessment, questions are to be identical.)
- Assessment of evidence should establish the candidate's ability to perform the job to the standard required in the workplace.
- Supplementary evidence may be obtained from relevant authenticated correspondence or reports from supervisors or team leaders. Other forms of evidence may include audit reports, customer survey reports and appraisal reports.
- Candidate should be encouraged to compile a portfolio of examples of completed documentation relevant to candidate's organisation. One accurate example of each completed document is suggested as sufficient to infer competency and the ability to transfer appropriate skills to each document type when required in the workplace. (Oral questioning may contribute as evidence of this ability.)
- Information derived from enterprise policies and practices must be treated as commercial-in-confidence.
- In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.
- Questioning will be undertaken in such a manner as is appropriate to the oracy, language and literacy levels of the candidate and any cultural issues that may affect responses to the questions. It will reflect requirements of the unit of competency and the work being performed.
- Where assessment is for the purpose of recognition (RCC or RPL), the evidence provided will need to be authenticated and show that it represents current competency demonstrated over a period of time.

- Performance and assessment of this unit must be carried out within the relevant requirements of the following legislative and industry framework:
  - building Acts, regulations and codes
  - Australian and international standards identified as relevant to the required inspect, test and maintain procedure
  - environmental regulations
  - manufacturer specifications
  - organisational requirements, including policies and procedures relating to ODS, SGG and OHS
  - ODS and SGG legislation, codes and regulations
  - OHS legislation, codes and regulations.

## Range Statement

### RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

**Note:** Australian standards are frequently revised and users must always check for currency.

- Legislative requirements*** may include:
- relevant federal, state and territory building Acts, regulations and codes
  - OHS legislation, codes and regulations
  - relevant current Australian standards, such as AS 1851, AS 1603, AS 1670, AS 4214, AS 4428 and AS 2030
  - ODS and SGG legislation, codes and regulations, such as *Ozone Protection and Synthetic Greenhouse Gas Management Amendment Regulations, 2005*
  - fire protection industry codes of practice
  - manufacturer system manuals
  - dangerous goods regulations
  - licensing arrangements
  - environmental regulations
  - building surveyor requirements

**Work procedures** may include:

- other relevant legislation relating to fire protection equipment, including international, shipping and marine codes
- Australian petroleum industry requirements.
- instructions from colleagues, supervisors and managers
- specific customer requirements
- work instructions to prevent the emission of ODS and SGG in the workplace
- assignment instructions
- equipment manufacturer requirements
- reporting and documentation requirements
- personal protective equipment (PPE) requirements.

**Relevant persons** may include:

- team leaders
- supervisors
- managers
- colleagues
- building owners or nominated representatives
- customers.

**ODS and SGG** materials are listed using the format: **Product name** (other names); use. Check the latest amendments to the *Ozone Protection and Synthetic Greenhouse Gas Management Act* for the current list of ODS and SGG extinguishing agents which may include:

- **Blitz III** (HCFC Blend D); used in flooding systems
- **CFC 11** (trichlorofluoromethane, CCl<sub>3</sub>F); may be found as a propellant in some powder fire extinguishers (this product is banned in Australia)
- **FC-2-1-8** (CEA-308, CF<sub>3</sub>CF<sub>2</sub>CF<sub>3</sub>); used in flooding systems
- **FC-3-1-10** (CEA-410, C<sub>4</sub>F<sub>10</sub>); used in flooding systems
- **FC-5-1-14** (CEA-614, C<sub>6</sub>F<sub>14</sub>); used as a streaming agent
- **FE-227** (heptafluoropropane, HFC-227ea); used as a total flooding extinguishing agent - is a replacement for Halon 1301
- **FE-25** (pentafluoroethane, HFC-125); used in inerting and explosion suppression applications and retro-fit to existing Halon 1301 systems
- **FE-36** (hexafluoropropane, HFC-236fa); used in portable fire extinguishers - is a replacement for Halon 1211 and Halon 1301
- **FE-13** (trifluoromethane, HFC-23); used as a total flooding agent
- **FE-241** (chlorotetrafluoroethane, HCFC-124); used as a total flooding agent for non-occupied spaces and as a streaming agent
- **FM100**<sup>®</sup> (HBFC-22B1); used in portable fire extinguishers
- **FM200**<sup>®</sup> (heptafluoropropane, HFC-227ea); used in chemical storage areas, clean rooms, communications facilities, laboratories, museums, robotics and emergency power facilities

- **Halotron** (HCFC Blend B); used as a total flooding agent and streaming agent
- **Halon 1211** (BCF); used as a streaming agent - requires a special permit in Australia
- **Halon 1301** (BTM); used as a total flooding agent - requires a special permit in Australia
- **Halon 2402 (dibromotetrafluoroethane, C<sub>2</sub>Br<sub>2</sub>F<sub>4</sub>)**; limited use in military systems - requires a special permit in Australia
- **HCFC 22 (chlorodifluoromethane, CHClF<sub>2</sub>)**; used as a propellant in some powder fire extinguishers (this product is banned in Australia)
- **HFC 134a** (unsymmetric tetrafluoroethane, CH<sub>2</sub>FCF<sub>3</sub>); used as a propellant in some powder fire extinguishers
- **NAF-S-III** (HCFC Blend A); used as a total flooding agent - is a replacement for Halon 1301
- **NAF-P-III** (HCFC Blend C); used as a streaming agent - is a replacement for Halon 1211
- **NAF-P-IV** (HCFC Blend E); used as a streaming agent
- **SF<sub>6</sub>** (sulfurhexafluoride, SF<sub>6</sub>); used as an inerting agent for sealed high voltage switchgear.

**Key functional requirements** relate to interpreting the system functions within design limitations, such as:

- system is total flooding or local
- gaseous system suppression of fire mechanism in relation to the fire triangle
- gaseous flooding discharge time and holding time, and factors that can effect these key design requirements, including:
  - pipe blockages
  - nozzle location
  - orifices
  - openings in protected enclosure
- understanding of environmental and occupational hazards caused by gaseous agents.

**Potential and actual breaches** could be identified by:

- direct observation
- workplace quality assurance teams.

**Organisational requirements** may be located in quality assurance and/or procedures manuals and relate to:

- legal and organisational policies and guidelines
- personnel practices and guidelines outlining work roles, responsibilities and delegations
- legislation relevant to service operations
- OHS policies, procedures and programs
- ODS and SGG policies, procedures and programs

***OHS policies and procedures*** may relate to:

- documentation and information systems and processes
- use of electronic job scheduling and communication devices.
- employer and employee rights and responsibilities
- the OHS hierarchy of control
- assessing the work site for hazards and risks prior to preparing it for the work procedure
- displaying signs and using barriers in work area
- hazard and risk identification and reporting
- risk assessment and control measures
- incident and accident investigation
- OHS audits and safety inspections
- safe operating procedures and instructions, including:
  - working safely around electrical wiring, cables and overhead powerlines
  - working safely around tools and equipment
  - working safely on ladders and raised platforms
  - risk and hazard recognition
  - emergency procedures
  - awareness of electrical hazards
  - following confined spaces procedures
  - using PPE, including:
    - safety glasses or goggles
    - safety boots or shoes
    - hard hats
    - earmuffs or plugs
    - appropriate gloves and overalls
    - sunhats
    - dust masks
- equipment maintenance and use
- use and storage of hazardous substances
- first aid.
- may include:
  - liquefied gas extinguishing agents
  - non-liquefied gas extinguishing agents
- amount of extinguishant in each container may be determined by weighing methods or using liquid level detectors
- gaseous extinguishants may vary according to the specific installation.

***Gaseous fire suppression systems:***



***System components*** may include:

- fire alarm system interface components, such as:
  - anti-tamper switches
  - gaseous system controls and indicators on control and indicating equipment (CIE), such as fire indicating panels (FIP) approved to AS 1603 or AS 4428
  - positional monitoring switches
  - pressure switches
  - pyrotechnic actuators (detonators)
  - remote gas control points
  - solenoid valve actuators
- warning system equipment, such as:
  - alarm bells
  - warning lights and strobes
  - warning speakers
- fixed gaseous agent fire protection equipment, such as:
  - actuation control devices mounted (installed) on the container valve assembly to actuate the container valve, such as:
    - electrical operation: signal generated from CIE panel as part of a fire alarm detection system
    - pneumatic operation: from fire detector (typically heat)
    - mechanical operation: via signal from Local Control Station or fire detector
    - manual operation: by direct push lever or pull cable system
  - agent discharge nozzles
  - container discharge valves
  - discharge piping and fittings, and supports
  - flexible discharge hose and fittings
  - gaseous agent containers
  - pilot and slave tubes
  - fittings
  - pressure relief and directional valves
  - system lock-off valves
  - system operational indication devices.

***Installation drawings*** may include:

- installation drawings that meet the requirements of AS 4214 and AS 1670, including:
  - 'for construction' drawings

- 'as installed' or 'as built' drawings.
- Isolation devices** may include:
- CIE including:
    - gas control panels
    - fire indicating panels
  - pneumatic isolation devices
  - mechanical isolation devices.
- Work permits** may include permits to:
- enter a work site
  - enter a restricted area within a work site
  - enter a work site at specific times
  - ensure that specific OHS requirements are met before entering a work site.
- Hazards** may include:
- ergonomic, such as incorrect manual handling methods
  - environmental, such as improper use of ODS and SGG, hazardous materials and other chemicals
  - environmental risks from ODS and SGG emissions that could be caused by:
    - transporting, storing and manual handling ODS and SGG containers
    - servicing and maintaining container valve assemblies
    - installing and removing container valve assembly, manifold connection components and actuation control devices
    - conducting interface tests between container actuation control devices, CIE and fire alarm system during inspect, test and maintain procedures
  - obstructive, such as blocked access to emergency entry or exit points
  - hazards associated with electrical or mechanical faults
  - any source of potential harm
  - any situation with a potential to cause loss
  - equipment in a work site
  - people in a work site
  - work methods, plans and procedures.
- Tools, equipment and testing devices** may include:
- hand tools, including:
    - hammers
    - pliers
    - screwdrivers
    - spanners

- spirit levels
- power tools, including:
  - battery-powered drills
  - hammer drills
- manual handling aids, including:
  - hand trucks
  - lifting straps
  - trolleys
- servicing tools and testing devices, including:
  - actuator simulators
  - barcode readers
  - container contents test equipment
  - electrical multi-meter
  - re-charging and pressurising equipment
  - safety equipment
  - scales
  - service tag punch
- fire equipment spare parts, including:
  - aerosol test smoke
  - anti-tamper seals
  - clamps
  - service tags.

***Back-to-base facilities:***

- monitoring equipment that is connected by alarm signalling equipment (ASE) from the CIE to a communication path (telephone line or a radio link) and then to a monitoring centre
- monitoring centres can be operated by or on behalf of a fire authority for the purposes of mobilising and directing firefighting resources to site where CIE is installed.

***Mechanical inspection tasks***  
may include:

- actions to complete mechanical inspection tasks according to AS 1851, such as:
  - check that gas discharge pipe lock-off valve (if fitted) is correctly labelled and accessible
  - visually check that all gas containers are secure, accessible and free from damage
  - inspect each container pressure indicator to check that the pressure is within the prescribed limits
  - where there is no container pressure indicator, check that system discharged indicator has not operated

- check that all release mechanisms, including drop weights, are undamaged, accessible and unimpeded
- check gas container enclosure is accessible, adequately illuminated, ventilated and secured against unauthorised entry
- check integrity of all pneumatic piping and fittings
- check that entire protected area enclosure complies with original design
- check that all discharge nozzles are clear and unobstructed, correctly aimed and secured
- check all actuating devices for any condition that is likely to adversely affect their operation, such as excessive deposits of dust or paint coating
- inspect all areas adjacent to protected area to ensure that migration of gas does not create a hazard to personnel
- inspect protected area to check that the risk has not changed from original design, such as computer room to combustible storage and equipment
- check that all pipework, flexible connectors and manifolds are free from damage and adequately secured
- check that discharge from all pressure-relief devices and vent valves does not create a hazard to personnel
- check that all directional valves and check valves are correctly orientated
- check to determine if cylinder valve overhaul is due
- check to determine if cylinder hydrostatic pressure test is due in accordance with AS 2030.1 or AS 1851
- check age of pyrotechnic actuator to determine if due for replacement.

***Maintenance schedule periods*** may be:

- monthly
- six-monthly
- yearly
- five-yearly
- ten-yearly.

- Documentation** may include:
- service test record logbooks
  - job cards
  - customer recommendation forms
  - service agreements
  - expense claims
  - application for credit forms
  - equipment recommendation forms
  - motor vehicle fleet cards
  - corrective action reports
  - petty cash vouchers
  - certificates of inspection
  - product documentation
  - maintenance record systems.
- Customer requirements** may include:
- providing routine services
  - providing non-routine or urgent services
  - confirming or varying service instructions
  - sighting work permits
  - sign-in and sign-out procedures for entry to or exit from premises
  - written or verbal confirmation of services provided and future maintenance schedule.
- Mechanical test tasks** may include:
- actions to complete mechanical test tasks according to AS 1851, such as:
    - simulate a system operation and confirm that discharge actuators and directional valves operate correctly
    - test operation of all mechanical manual discharge release systems
    - test operation of mechanical automatic discharge release systems not operated through CIE, such as fusible links
    - operate system lock-off valve and confirm that the system inoperative visual warning device (VWD) operates
    - confirm by weighing or other acceptable means that each gas container is charged with correct quantity of extinguishing agent
    - test to ensure correct operation of all automatic pneumatic controls
    - simulate operation of agent release detection device and confirm indication of agent release at system control panel.
- Mechanical preventive**
- actions to complete routine mechanical

*maintenance tasks* may include:

maintenance tasks according to AS 1851, such as:

- check operation of mechanical container actuator and lubricate as necessary
  - check operation of remote mechanical release system and lubricate as necessary
  - check operation of automatic mechanical release system and lubricate as necessary
  - replace pyrotechnic container actuator that will exceed its listed lifetime prior to next scheduled maintenance
  - clean dampers and nozzles that are subject to deposit of contaminants, such as cooking oil, hot wax, etc.
- actions to conduct non-routine maintenance, such as general isolation to CIE so that building works can be done, then resetting systems after works are completed.
- confirming all interface actuation control devices are isolated and appropriate signage, documentation and lock-off are in place
- removing transport caps on actuation outlets, plugs and locking devices according to manufacturer and organisational requirements
- re-installing pneumatic actuators and pilot and slave tubes and fittings according to finalised design documentation and installation drawings
- checking pneumatic actuator and pilot and slave tubes connection are free from kinks and physically checking for tightness
- re-installing electrical and mechanical actuators according to finalised design documentation and installation drawings
- physically checking tightness of electrical and mechanical actuators and that they are correctly set to operate
- re-installing manual actuators according to finalised design documentation and installation drawings
- physically checking tightness of manual actuators and that they are correctly set to operate with safety device engaged
- activating all interface actuation control devices and removing signage, documentation and lock-off for functional testing
- advising relevant persons that system is fully

*Reinstate process* may involve:

- operational and providing appropriate technical, maintenance or handover instructions on operation of system
- leaving work site clean and tidy with materials disposed of or recycled according to state or territory legislative and industry requirements.

## **Unit Sector(s)**

### **Sector**

Fire Protection Equipment

## **Competency field**

### **Competency field**

Asset Maintenance