



Australian Government

PMASUP245A Break and make flanged joints using hand tools

Release 1

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Modification History

New unit - Release 1

Unit Descriptor

This unit of competency covers the skills and knowledge needed to break and make flanged joints using hand tools. It also includes solving problems with flanged pipe jointing processes and equipment.

Application of the Unit

This unit applies to an operator who has a responsibility for breaking and making flanged joints (e.g. for isolation purposes) in accordance with a site's flange management procedures. The operator would further:

- ensure they were working within their skill level
- ensure the nature of the intervention was clearly understood before work commenced
- make certain the site was accessible and safe and that all necessary authorities had been obtained
- monitor the progress of the work and refer any escalation
- recommission the flange joint after the work and inspection is completed.

This unit applies to an individual working alone or as part of a team or group and working in liaison with other shift team members and the control room operator as appropriate.

It may be appropriate to access other units with this unit, such as:

- PMASUP244A Prepare and isolate plant.

ASME PCC-1-2010 Guidelines for Pressure Boundary Bolted Flange Joint Assembly provides technical information and guidance relevant to this unit.

This unit **does not** cover the use of hydraulic torqueing and power tools.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

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| 1 | Plan and prepare for job | 1.1 | Identify work requirements |
| | | 1.2 | Inspect job site |
| | | 1.3 | Confirm isolations have been completed to standard |
| | | 1.4 | Confirm hazard controls |
| | | 1.5 | Coordinate with appropriate personnel |
| | | 1.6 | Select appropriate tools |
| | | 1.7 | Check calibration and certification of tools as required |
| | | 1.8 | Re-check that work requirements fit within skill level |
| | | 1.9 | Complete checklists and records as required |
| 2 | Break flange in accordance with flange management procedure | 2.1 | Implement hazard controls |
| | | 2.2 | Prepare tools, drip trays, and so on with appropriate care |
| | | 2.3 | Connect any required drain lines |
| | | 2.4 | Undo nuts in accordance with procedures |
| | | 2.5 | Split flange and drain pipe as required |
| | | 2.6 | Identify any skills escalation required |
| | | 2.7 | Manage open pipe |

- 2.8 Complete checklists and records as required
- 3 Inspect flange and components
 - 3.1 Inspect removed gasket
 - 3.2 Assess cold pull and refer if required
 - 3.3 Assess degree of misalignment and refer if required
 - 3.4 Clean and inspect flange surface both front and back
 - 3.5 Check studs and nuts
 - 3.6 Confirm compliance of components and refer as required
 - 3.7 Identify any problems and take appropriate action
- 4 Make flange joint in accordance with flange management procedure
 - 4.1 Select appropriate gasket
 - 4.2 Check all components are to specification
 - 4.3 Apply lubricant as required
 - 4.4 Complete initial assembly of joint
 - 4.5 Insert blind as required
 - 4.6 Attach drain if required
 - 4.7 Re-check the gasket
 - 4.8 Re-check alignment
 - 4.9 Tighten using appropriate hand tools to procedure
 - 4.10 Use torque calibration charts as required
 - 4.11 Complete checklists and records as required
- 5 Finish the job
 - 5.1 Make a final check of joint alignment
 - 5.2 Organise required checks
 - 5.3 Confirm joint integrity as required
 - 5.4 Complete checklists and records as required

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using a limited range of hand tools
- recognising conditions which will lead to a poor joint
- implementing enterprise procedures within time constraints and in a manner relevant to the correct use of the equipment
- conveying information relevant to the operation clearly and effectively
- maintaining appropriate levels of quality assurance
- reading and numeracy to interpret/complete workplace documents and technical information
- applying mathematics required for the use of calibration charts

Required knowledge

Required knowledge of flange jointing principles and typical problems to a level needed to break and make flanged joints using hand tools, includes:

- all flange and gasket types as applicable
- principles of how flanged joints seal
- tool types and applications
- organisation's flange management procedure
- duty of care obligations
- hierarchy of control
- communication protocols, e.g. radio, phone, computer, paper and permissions/authorities
- typical issues causing problems and the resolution of those problems
- routine problems, faults and their symptoms, and the corrective action to be taken
- process materials and conditions at the location of the flange
- function and troubleshooting for addressing leaks
- using flange tags/completeness tags
- relevant environmental requirements
- relevant parts of ASME PCC-1-2010 Guidelines for Pressure Boundary Bolted Flange Joint Assembly

Evidence Guide

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

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

Critical aspects for assessment and evidence include:

- the breaking and making of a flanged joint in accordance with the organisation's flange management procedure
- recognising own skill limits and when to refer to another person.

Context of and specific resources for assessment

Assessment of this competency will occur over a range of situations which will include typical disruptions to normal, smooth operation. This will require access to a plant over a period of time, or a suitable method of gathering evidence of operating ability. Where safety, lack of opportunity or significant cost is an issue, an industry-based simulation may be employed to assist the process.

Guidance information for assessment

Assessment processes and techniques must be appropriate to the language, competency and safety requirements of the site and consistent with workplace systems or procedures.

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. 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) may also be included.

Context

This competency includes breaking and making flange joints using hand tools. It **does not** include the use of:

- pneumatic torqueing tools
- hydraulic torqueing tools
- powered torqueing tools

Work requirements

Work requirements may include but are not limited to:

- flange and gasket specifications
- stud and nut specification
- process line and process materials
- parts and equipment required
- local detectors requiring isolation
- required skill level
- conflicting work

Work requirements may come from briefings, handovers, and work orders and may include:

- compliance documentation
- product specifications
- nature and scope of tasks
- achievement targets
- operational conditions
- lighting conditions
- plant or equipment defects
- hazards and potential hazards
- coordination requirements or issues

Job site

Inspecting job site may include but is not limited to identifying:

- location
- authorisations required
- access and egress needs
- hazards
- recent work undertaken on joint
- flange type (matches specification)

Control hazards

Control hazards may include but is not limited to:

- selection and use of appropriate personal protective equipment
- obtaining appropriate authorisations
- checking required isolations
- controlling other work in area

Implement hazard controls

Implementing hazard controls may include but is not limited to:

- controlling access to area
- using gas tester
- verifying and confirming isolation
- safe flange breaking procedure (line of fire)

Manage open pipe

Manage open pipe includes:

- all those actions required once the flange is broken to ensure the pipe and its contents are not contaminated or damaged

Inspect components

Inspecting flange components may include but is not limited to:

- checking for asbestos in gaskets
- looking for signs of damage, defects or deterioration in all components
- cleanliness and correct surface roughness of mating surfaces
- alignment

Refer to appendices of ASME PCC-1-2010 Guidelines for Pressure Boundary Bolted Flange Joint Assembly for technical details

Components

Components may include but are not limited to:

- studs
- nuts
- washers
- gaskets

Check studs and nuts

Checking studs and nuts may include but is not limited to checking:

- integrity of studs and nuts
- fit of nut to stud
- need for new studs and nuts
- conformance to specification

Initial assembly of joint

Initial assembly of joint may include but is not limited

to:

- aligning joint
- inserting studs
- assembling nuts to studs
- inserting and aligning gasket

Blinds

Blinds may include but are not limited to:

- blinds
- blanks
- spectacle/goggle blinds

Refer

Refer means to refer the issue to the person with the required skills, knowledge and/or authority to deal with the matter

Procedures

Procedures may be written, verbal, computer-based or in some other form. They may include but are not limited to:

- flange management procedures
- all work instructions
- standard operating procedures
- temporary instructions
- any similar instructions provided for the smooth running of the plant
- good operating practice as may be defined by industry codes of practice

Procedures would be expected to comply with any relevant government regulations.

Checklists and records

Checklists and records may include:

- paper or electronic based and verbal/radio reports
- reporting items found which require action

Appropriate action

Appropriate action includes but is not limited to:

- determining problems needing action
- accessing and applying relevant technical and plant data
- applying appropriate problem solving techniques to determine possible fault causes
- rectifying problem using appropriate solution within area of responsibility
- following through items initiated until final resolution has occurred
- reporting problems outside area of responsibility/ability to resolve to designated

person

Typical problems

Typical problems may include but are not limited to:

- seal/gasket leaks
- pressure loss/low flow
- blockages/build-up/fouling
- erosion/wear
- ancillary equipment problems
- studs incorrectly tensioned
- worn threads
- misalignments
- cold pull
- isolation failure
- leak test failure

Remedial actions

Remedial actions may include but are not limited to:

- replacing existing components with new components
- carrying out minor maintenance within operator's skill level
- identifying and reporting problems outside operator's competence
- identifying and controlling hazards related to flange joints

Health, safety and environment (HSE)

All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Competency field

Unit sector Support

Custom Content Section

Not applicable.