



Australian Government

PMASUP245 Break and make flanged joints using hand tools

Release: 1

PMASUP245 Break and make flanged joints using hand tools

Modification History

Release 1. Supersedes and is equivalent to PMASUP245A Break and make flanged joints using hand tools

Application

This unit of competency covers the skills and knowledge required to break and make flanged pipe joints using hand tools.

This unit of competency does not apply where pneumatic, hydraulic or powered torquing tools are required to be used.

This unit of competency applies to operators who are required to identify requirements for the work, ensure they are working within their skill level, confirm isolations are in place, apply procedures to break and make joints, undertake checks and inspections, complete records, and identify problems and take appropriate action.

This unit of competency 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.

This unit of competency aligns to the technical information in *ASME PCC-1-2013 Guidelines for pressure boundary bolted flange joint assembly*.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Support

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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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 in accordance with procedures
 - 1.8 Re-check that work requirements fit within skill level
 - 1.9 Complete required checklists and records
- 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 to ensure contents are not contaminated or damaged
 - 2.8 Complete checklists and records as required
- 3 **Inspect flange and components**
 - 3.1 Inspect removed gasket for indications of flange problems
 - 3.2 Assess cold pull and refer to appropriate personnel if required
 - 3.3 Assess degree of misalignment and refer to appropriate personnel if required
 - 3.4 Clean and inspect flange surface both front and back
 - 3.5 Check studs and nuts

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| | | 3.6 | Confirm compliance of components and refer to appropriate personnel as required |
| | | 3.7 | Identify any problems and take 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, blank or spectacle/goggle 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 |

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Regulatory framework

The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used, and include one or more of the following:

- legislative requirements, including work health and safety (WHS)
- industry codes of practice and guidelines
- environmental regulations and guidelines
- Australian and other standards
- licence and certification requirements

All operations to which this unit applies are subject to stringent health, safety and environment (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.

Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, include one or more of the following:

- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant

Hazards

Hazards include one or more of the following:

- gases and liquids under pressure
- structural hazards
- equipment failures

- industrial (machinery, equipment and product)
- equipment or product mass
- plant services (steam, condensate and cooling water)
- limited head spaces or overhangs
- working at heights, in restricted or confined spaces, or in environments subjected to heat, dusts or vapours
- flammability and explosivity
- hazardous products and materials
- unauthorised personnel
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- extreme weather
- other hazards that might arise

Routine problems

Routine problems must be resolved by applying known solutions.

Routine problems are predictable and include one or more of the following:

- 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

Known solutions are drawn from one or more of the following:

- procedures
- training
- remembered experience

Non-routine problems must be reported according to according to relevant procedures.

Action

Action in response to problems includes the following:

- 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

Action also requires one or more of the following:

- 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

Work requirements

Work requirements include one or more of the following:

- 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 come from briefings, handovers, and work orders and include one or more of the following

- 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 includes identifying one or more of the following: • location • authorisations required • access and egress needs • hazards • recent work undertaken on joint • flange type (matches specification)
Implementing hazard controls	Implementing hazard controls includes one or more of the following: • selection and use of appropriate personal protective equipment (PPE) • obtaining appropriate authorisations • checking required isolations • controlling other work in area • controlling access to area • using gas tester • verifying and confirming isolation • safe flange breaking procedure (line of fire)
Inspecting components	Inspecting flange components includes one or more of the following: • asbestos in gaskets • signs of damage, defects or deterioration in all components • cleanliness and correct surface roughness of mating surfaces • alignment Refer to appendices of <i>ASME PCC-1-2013 Guidelines for pressure boundary bolted flange joint assembly</i>, for technical details.
Components	Components include the following: • studs • nuts • washers • gaskets • other components as appropriate to the job/work environment
Checking studs and nuts	Checking studs and nuts includes one or more of: the following • integrity of studs and nuts

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

Initial assembly of joint Initial assembly of joint includes one or more of the following:

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

Blinds Blinds include one or more of the following:

- blinds
- blanks
- spectacle/goggle blinds

Appropriate personnel Appropriate personnel will be someone with the required skills, knowledge and/or authority to deal with the matter, including one or both of the following:

- a supervisor
- an engineer

Checklists and records Checklists and records may include one or more of the following:

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

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMASUP245A Break and make flanged joints using hand tools

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=9fc2cf53-e570-4e9f-ad6a-b228ffdb6875>

Assessment Requirements for PMASUP245 Break and make flanged joints using hand tools

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria, and include the ability to:

- replace existing components with new components
- carrying out minor maintenance within own skill level
- identify and report problems outside own competence
- identify and control hazards related to flange joints
- inspect job site to confirm:
 - location
 - authorisations required
 - access and egress needs
 - recent work undertaken on joint
 - flange type matches specification
- inspect flange components to check for:
 - contaminants
 - signs of damage, defects or deterioration in all components
 - cleanliness and correct surface roughness of mating surfaces
 - alignment
 - correct specifications.

Knowledge Evidence

- Evidence must be provided that demonstrates knowledge of:
- flange and gasket types as applicable
- principles of how flanged joints seal
- tool types and applications
- organisation's flange management procedure
- hierarchy of control
- communication protocols (e.g. radio, phone, computer, paper and permissions/authorities)
- routine problems, faults and their symptoms, and the corrective action to be taken
- process materials and conditions at the location of the flange
- using flange tags/completeness tags
- relevant environmental requirements

relevant parts of ASME PCC-1-2013 Guidelines for pressure boundary bolted flange joint assembly.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence based on a holistic assessment of the evidence.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant
 - will typically include a supervisor/third-party report focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the breaking and making of at least two (2) flanged joints, the use of appropriate tools, equipment and safety gear requiring demonstration of preparation, operation, completion and responding to problems
 - may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible, or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment reflecting realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from one or more of:
 - walk-throughs
 - pilot plant operation
 - demonstration of skills
 - industry-based case studies/scenarios
 - ‘what ifs’.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept).
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.

- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition, the assessor or anyone acting in subject matter expert role in assessment must demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they must assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
 - appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on-the-job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work

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